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State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
ENFORCEMENT ELEMENT - NORTHERN REGION
1259 Route 46 - Building 2
Parsippany-Troy Hills, NJ 07054

JOHN W. GASTON JR., P.E.
DIRECTOR

DIRK C. HOFMAN, P.E.
DEPUTY DIRECTOR

H A N D D E L I V E R E D

On September 26, 1986, Theodore A. Schwartz, Esq., of Schwartz, Tobia and Stanziale, received an Amended Administrative Consent Order, concerning L.E. Carpenter and Company in Wharton, New Jersey, which was executed by the New Jersey Department of Environmental Protection and L.E. Carpenter and Company. The effective date of the Consent Order is September 26, 1986.

9/26/86
Date

Received by

Theodore A. Schwartz
(Please Print Name)

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
CN 029
TRENTON, NEW JERSEY 08625

JOHN W. GASTON JR., P.E.
DIRECTOR

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DEPUTY DIRECTOR

IN THE MATTER OF	:	AMENDED
L. E. CARPENTER AND	:	ADMINISTRATIVE
COMPANY	:	CONSENT
	:	ORDER

This Administrative Consent Order (sometimes referred to as "1986 Administrative Consent Order") is entered into pursuant to the authority vested in the Commissioner of the New Jersey Department of Environmental Protection (hereinafter "NJDEP") by N.J.S.A. 13:1D-1 et seq., and the Water Pollution Control Act, N.J.S.A. 58:10A-1 et seq., and duly delegated to the Director of the Division of Water Resources pursuant to N.J.S.A. 13:1B-4.

FINDINGS

1. L.E. Carpenter, a wholly owned subsidiary of Dayco Corporation, operates a facility located at 170 North Main Street (Block 301, Lot 1 and Block 703, Lot 30) in the Borough of Wharton, Morris County, New Jersey (hereinafter "the site" or "the facility"). L.E. Carpenter manufactures vinyl wall coverings.

2. From approximately 1963 until 1970, L.E. Carpenter disposed its wastes, including a polyvinyl chloride (PVC) waste material, into an on site impoundment. Furthermore, L.E. Carpenter used a subsurface waste disposal system in 1967 to discharge industrial waste.

3. L.E. Carpenter submitted to NJDEP a report dated October 2, 1979, concerning the characterization of the PVC waste material disposed in the impoundment and an evaluation of remedial alternatives for the impoundment. The report indicated that a chemical analysis of the PVC waste material collected from the impoundment on July 25, 1979, showed the presence of the following pollutants: di-n-butyl phthalate, diethyl phthalate, phenol,

antimony, barium, cadmium, chromium, copper, magnesium, lead and zinc.

4. On August 18, 1980, NJDEP sampled the PVC waste material in the impoundment referenced in paragraph 2. The analytical results indicated the presence of the following pollutants: antimony, barium, nickel, copper, lead, xylene, styrene, nonane, cumene, heptane, dibromomethane, mesitylene, p-cymene, butyl benzene, toluene, trichloroethylene, chloroform and benzene.

5. On August 18, 1980, NJDEP collected from ground-water monitor wells installed at the site, samples of ground water and of immiscible chemical compounds floating upon the ground water. The analytical results of these samples indicated that the ground water at the site was contaminated with immiscible (free floating) and dissolved pollutants including: 1,2 dichloroethane, trichloroethylene, toluene, ethylbenzene, styrene, dibromoethane, propyl benzene, xylene, cumene, mesitylene, cymene, tetrachloroethylene, tetrachloroethane, chlorobenzene, copper, lead, arsenic, zinc, antimony, barium and nickel.

6. On March 3, 1981 and December 7, 1981, NJDEP collected ground-water samples from a monitoring well installed at the site. Analytical results of the samples indicated the presence of 16.8 parts per million (ppm) and 135 ppm, respectively, of polychlorinated biphenyls, a pollutant. Subsequent testing in other areas of the site did not show the presence of PCB's.

7. On January 29, 1982, L.E. Carpenter and NJDEP entered into an Administrative Consent Order (hereinafter "1982 Administrative Consent Order"), which required L.E. Carpenter to:

   a. Remove the waste sludge from the impoundment;

   b. Define the full extent of chemical compounds floating upon the ground water;

   c. Decontaminate the ground water beneath the site as follows:

      i. Remove the immiscible chemical compounds from the ground water; and

      ii. Remove dissolved volatile organic compounds, including hazardous substances, from the ground water beneath the site; and

   d. Monitor ground-water quality according to the following schedule:

      i. Collect samples to be analyzed for specific volatile organic compounds every two months for a six month period beginning on or about June 1982 and quarterly thereafter; and

ii. Take measurements every month to determine ground water flow direction(s) and the thickness of the free floating organic compounds floating upon the ground water.

On February 24, 1983, an Addendum (hereinafter "1983 Addendum") was added to the 1982 Administrative Consent Order to clarify its provisions.

8. Pursuant to the requirements of the 1982 Administrative Consent Order and the 1983 Addendum, referenced in paragraph 7 of this Administrative Consent Order, L.E. Carpenter took the following actions: In April 1982 and May 1982, L.E. Carpenter removed over 4,000 cubic yards of waste from the impoundment; thereafter L.E. Carpenter implemented a ground-water quality monitoring program. On May 11, 1984, L.E. Carpenter also began removing the immiscible chemical compounds from the top of the water table beneath the site.

9. L.E. Carpenter has not removed all of the waste from the impoundment and all of the immiscible chemical compounds from the ground water. Furthermore, L.E. Carpenter has not fully defined the extent of the groundwater pollution nor has it decontaminated the ground water.

10. Pursuant to the requirements of the 1982 Administrative Consent Order to implement a ground-water monitoring program described in paragraph 7d of this Administrative Consent Order, L.E. Carpenter submitted analytical results of samples collected and measurements taken during the period from 1982 until the winter of 1986. These results revealed the presence of the following pollutants in the ground water at the site: benzene, ethyl benzene, chloroform, butyl benzene, chlorobenzene, cumene, p-cymene, 1,2-diethyl benzene, 1-ethyl 3-methyl benzene, methylene chloride, mesitylene, nonane, propyl benzene, 1,2,3,4-tetramethyl benzene, 1,2,3,5-tetramethyl benzene, toluene, 1,2,3-trimethyl benzene, 1,2,4-trimethyl benzene and xylene. Furthermore, results submitted by L.E. Carpenter for samples collected in January, 1986, indicated the presence of the pollutants ethyl benzene, mesitylene and xylene in the ground water at the site.

11. Based on the facts set forth in the FINDINGS, NJDEP has determined that L. E. Carpenter has violated the Water Pollution Control Act, N.J.S.A. 58:10A-1 et seq., specifically, N.J.S.A. 58:10A-6, and the regulations promulgated pursuant thereto, N.J.A.C. 7:14A-1 et seq., specifically N.J.A.C. 7:14A-1.2(c).

12. In order to determine the nature and extent of the problem due to the discharge of pollutants at the site and to develop environmentally sound remedial actions, it is necessary to conduct additional remedial investigations as well as a feasibility study of remedial action alternatives (hereinafter "RI/FS") for the site. To correct the problems caused by the discharge it is necessary to modify the 1982 Administrative Consent Order as amended.

13. L.E. Carpenter disputes certain FINDINGS in this Administrative Consent Order. To resolve this matter without necessity for litigation, L.E. Carpenter has agreed to enter into this Amended Administrative Consent Order (hereinafter "1986 Administrative Consent Order") to conduct an RI/FS and to implement the remedial action alternative selected by NJDEP to remedy all pollution at and/or emanating from the site. By entering into this Administrative Consent Order, L.E. Carpenter does not make any admission with respect to any issue of fact, law or liability, with the exception of the ORDER provisions set forth herein below and the same does not constitute a determination or finding as to any violation of law.

ORDER

NOW, THEREFORE, IT IS HEREBY ORDERED AND AGREED THAT:

I. REMEDIAL INVESTIGATION, FEASIBILITY STUDY AND REMEDIAL ACTION

A. Remedial Investigation

14. Within ninety (90) calendar days after the effective date of this Administrative Consent Order, L.E. Carpenter shall submit to NJDEP a detailed draft Remedial Investigation Work Plan (hereinafter the "RI Work Plan") in accordance with Appendix A (Scope of Work), Appendix B (Site Maps) and Appendix C (Quality Assurance Requirements), which are attached hereto and made a part hereof. The RI Work Plan shall include a provision that a verification round of sampling be completed for all existing monitor wells on the system and all monitor wells installed pursuant to this Administrative Consent Order. This round of sampling shall be in accordance with Appendix C (Quality Assurance) of this Administrative Consent Order for the parameters set forth in Appendix A, Section IIC.3.e. and also for methyl ethyl ketone. The results of this round of sampling may be used to validate ground water data collected at the site by L.E. Carpenter prior to the effective date of this Administrative Consent Order, thereby enabling L.E. Carpenter to use such validated data as part of its submission required by paragraphs 17 through 28 of this Administrative Consent Order.

15. Within sixty (60) calendar days after receipt of NJDEP's written comments on the draft RI Work Plan, L.E. Carpenter shall modify the draft RI Work Plan to conform to NJDEP's comments and shall submit the modified draft RI Work Plan to NJDEP. The determination as to whether or not the modified RI Work Plan, as resubmitted, conforms to NJDEP's comments shall be made solely by NJDEP.

16. Upon receipt of NJDEP's written final approval of the RI Work Plan, L.E. Carpenter shall conduct the remedial investigation in accordance with the approved RI Work Plan and the schedule therein.

17. L.E. Carpenter shall submit to NJDEP a draft Remedial Investigation Report (hereinafter "RI Report") in accordance with Appendix A and the RI Work Plan and the schedule therein.

18. If upon review of the draft RI Report, NJDEP determines that additional remedial investigation is required, L.E. Carpenter shall conduct additional remedial investigation as directed by NJDEP and submit a second draft RI Report.

19. Within sixty (60) calendar days after receipt of NJDEP's written comments on the draft or second draft (if applicable pursuant to the preceding paragraph) RI Report, L.E. Carpenter shall modify the draft or second draft RI Report to conform to NJDEP's comments and submit the modified RI Report to NJDEP. The determination as to whether or not the modified RI Report, as resubmitted, conforms with NJDEP comments, shall be made solely by NJDEP.

B. Feasibility Study

20. Within sixty (60) calendar days after receipt of NJDEP's written final approval of the RI report, or as otherwise directed by NJDEP, L.E. Carpenter shall submit to NJDEP a draft Feasibility Study Work Plan (hereinafter "FS Work Plan") in accordance with the scope of work set forth in Appendix D which is attached hereto and made a part hereof.

21. Within sixty (60) calendar days after receipt of NJDEP's written comments on the draft FS Work Plan, L.E. Carpenter shall modify the draft FS Work Plan to conform to NJDEP's comments and shall submit the modified draft FS Work Plan to NJDEP. The determination as to whether the modified FS Report, as resubmitted, conforms to NJDEP's comments shall be made solely by NJDEP.

22. Upon receipt of NJDEP's written final approval of the FS Work Plan, L.E. Carpenter shall complete the feasibility study in accordance with the approved FS Work Plan and the schedule therein.

23. L.E. Carpenter shall submit to NJDEP a draft Feasibility Study Report (hereinafter "FS Report") in accordance with Appendix D and the FS Work Plan and the schedule therein. The scope of the draft Feasibility Study may be focused to take into account the interim remedial action contained in the Ground-Water Decontamination Plan referenced in Paragraph 69 of this Administrative Consent Order and previous remedial action taken by L.E. Carpenter at the site.

24. Within ninety (90) calendar days after receipt of the NJDEP's written comments on the draft FS Report, L.E. Carpenter shall modify the draft FS Report to conform to NJDEP's comments and shall submit the modified FS Report to NJDEP. The determination as to whether or not the modified FS Report, as resubmitted, conforms to the NJDEP's comments shall be made solely by NJDEP.

C. Remedial Action

25. NJDEP will make the final selection of the remedial action alternative.

26. Within ninety (90) calendar days after receipt of NJDEP's written notification of selection of a remedial action alternative, L.E. Carpenter shall submit to NJDEP, a detailed draft Remedial Action Plan in accordance with the scope of work set forth in Appendix E, which is attached hereto and made part hereof.

27. Within sixty (60) calendar days after receipt of NJDEP's written comments on the draft Remedial Action Plan, L.E. Carpenter shall modify the draft Remedial Action Plan to conform to NJDEP's comments and shall submit the modified draft Remedial Action Plan to NJDEP. The determination as to whether or not the modified Remedial Action Plan, as resubmitted, conforms to NJDEP's comments shall be made solely by NJDEP.

28. Upon receipt of NJDEP's written final approval of the Remedial Action Plan, L.E. Carpenter shall implement the approved Remedial Action Plan in accordance with the approved schedule therein.

D. Additional Remedial Investigation and Remediation

29. If NJDEP determines at any time that additional remedial investigation and/or remediation is required to protect human health or the environment, L.E. Carpenter shall conduct such additional activities as directed by NJDEP.

E. Permits

30. Within thirty (30) calendar days after the effective date, L.E. Carpenter shall submit a completed New Jersey Pollutant Discharge Elimination System (NJPDES) permit application pursuant to N.J.A.C. 7:14A-1 et seq. if required under the regulations for any present discharge into the Rockaway River not permitted.

31. L.E. Carpenter shall submit complete applications for all Federal, State and local permits required to carry out the obligations of this Administrative Consent Order in accordance with the approved time schedules.

32. Within thirty (30) calendar days of receipt of written comments concerning any permit application to a Federal, State or local agency, L.E. Carpenter shall modify the permit application to conform to the agency's comments and resubmit the permit application to the agency. The determination as to whether or not the permit application, as resubmitted, conforms with the agency's comments shall be made solely by the agency. L.E. Carpenter reserves all rights which it may have under applicable statutes and regulations to contest the provisions of any proposed permit. L.E. Carpenter's rights under N.J.A.C. 7:14A to contest any permits are not affected by this Administrative Consent Order;

provided, however, that L.E. Carpenter shall comply with this Administrative Consent Order.

33. Compliance with the terms of this Administrative Consent Order shall not relieve L.E. Carpenter from obtaining and complying with all applicable Federal, State and local permits and complying with all applicable statutes and regulations while carrying out the obligations imposed by this Administrative Consent Order.

34. The execution of this Administrative Consent Order shall not preclude NJDEP from requiring that L.E. Carpenter apply for any permit or permit modification issued by NJDEP under the authority of the Water Pollution Control Act, N.J.S.A. 58:10A-1 et seq., the Solid Waste Management Act, N.J.S.A. 13:1E-1 et seq., and/or any other statutory authority for the matters covered herein. The terms and conditions of any such permit shall not be preempted by the terms and conditions of this Administrative Consent Order even if the terms and conditions of any such permit are more stringent than the terms and conditions of this Administrative Consent Order. L.E. Carpenter reserves all rights which it may have under applicable statutes and regulations to contest the provisions of any proposed permit. L.E. Carpenter's rights under N.J.A.C. 7:14A to contest any permits are not affected by this Administrative Consent Order; provided, however, that L.E. Carpenter shall comply with this Administrative Consent Order.

F. Progress Reports

35. L.E. Carpenter shall submit to NJDEP quarterly progress reports; the quarters being January through March, April through June, July through September, and October through December of each calendar year. Each progress report shall be submitted on or before the thirtieth (30th) day of the month following the quarter being report. L.E. Carpenter shall submit the first progress report to NJDEP by October 30, 1986, for the July - September 1986 quarter. Each progress report shall detail the status of L.E. Carpenter's compliance with this Administrative Consent Order and shall include the following:

a. Identification of the site and reference to this Administrative Consent Order;

b. Status of work at the site and progress to date, including all data collected and field observations made;

c. Maps depicting isopachs of the thickness of immiscible chemical compounds in the aquifer and contour maps showing elevations of ground water and the top of the immiscible floating compounds;

d. Difficulties or problems encountered during the reporting period;

e. Actions taken or to be taken to rectify difficulties or problems;

f. List required and actual completion dates for each item required by Administrative Consent Order;

g. Provide an explanation of any deviation from the approved work plan, Remedial Action Plan or schedule;

h. Conclusions and recommendations drawn from the data and from observations; and

i. A discussion of performance evaluation of all remedial measures implemented.

II. PROJECT COORDINATION

36. L.E. Carpenter shall submit to NJDEP all documents required by this Administrative Consent Order, including correspondence relating to force majeure issues, by certified mail, return receipt requested or by hand delivery and with an acknowledgement of receipt form for NJDEP's signature. The date that NJDEP executes the receipt or acknowledgement will be the date NJDEP uses to determine L.E. Carpenter's compliance with the requirements of this Administrative Consent Order and the applicability of stipulated penalties.

37. Within seven (7) calendar days after the effective date of this Administrative Consent Order, L.E. Carpenter shall submit to NJDEP the name, title, address and telephone number of the individual who will be NJDEP's contact with L.E. Carpenter for all matters concerning this Administrative Consent Order. L.E. Carpenter shall contact the individual identified in paragraph 39 for all matters concerning this Administrative Consent Order.

38. L.E. Carpenter shall notify NJDEP verbally at least two (2) weeks prior to commencement of any field related activities pursuant to this Administrative Consent Order by telephoning (201) 299-7592 during normal business hours (9:00 a.m. to 5:00 p.m.). A written notification shall follow within five (5) calendar days of the verbal notification.

39. L.E. Carpenter shall submit four (4) copies of all documents required by this Administrative Consent Order to:

Joseph M. Mikulka, Chief
Northern Bureau of Regional Enforcement
Division of Water Resources
1259 Route 46 - Building 2
Parsippany, New Jersey 07054

III. FINANCIAL REQUIREMENTS

A. Stipulated Penalties

40. L.E. Carpenter shall pay stipulated penalties to NJDEP for their failure to comply with this Administrative Consent Order according to the following schedule, unless NJDEP has modified the compliance date pursuant to the force majeure provisions hereinbelow:

    a. Compliance one (1) to five (5) calendar days late: $500/calendar day penalty.

    b. Compliance six (6) to ten (10) calendar days late: $1,000/calendar day penalty.

    c. Compliance eleven (11) to twenty (20) calendar days late: $1,500/calendar day penalty.

    d. Compliance twenty-one (21) calendar days late and subsequent thereafter: $2,500/calendar day penalty.

41. Any such penalty shall be due and payable fourteen (14) calendar days following receipt of a written demand by NJDEP. Payment of such stipulated penalties shall be made by cashier's or certified check payable to the "Treasurer, State of New Jersey." Each payment of a stipulated penalty shall include a letter describing the basis for the penalty.

B. Financial Assurance

42. Within twenty-one (21) calendar days after the effective date of this Administrative Consent Order, L.E. Carpenter shall submit to NJDEP a proposed irrevocable letter of credit which meets the following requirements:

    a. Is identical to the wording specified in Appendix F which is attached hereto and made part hereof;

    b. Is issued for one (1) year and in the event that the issuing bank or financial institution is subject to Title 17 of the Revised Statutes of New Jersey, shall not be automatically renewable but shall be renewable upon reapplication and review only;

    c. Is issued by a New Jersey State or Federally chartered bank, savings bank, or savings and loan association which has its principal office in New Jersey.

43. Within twenty-one (21) calendar days after the effective date of this Administrative Consent Order, L.E. Carpenter shall submit a proposed irrevocable standby trust fund agreement which meets the following requirements:

a. Is identical to the wording specified in Appendix G which is attached hereto and made part hereof;

b. The irrevocable standby trust fund shall be the depository for all funds pursuant to a draft by NJDEP against the letter of credit;

c. The trustee shall be an entity which has the authority to act as a trustee and whose trust operations are regulated and examined by a Federal or New Jersey agency;

d. Is accompanied by a certification of acknowledgement that is identical to the wording specified in Appendix G which is attached hereto and made part hereof.

44. Within fourteen (14) calendar days after receipt of NJDEP's written comments on the proposed letter of credit, the proposed trust agreement, and the proposed certification of acknowledgement, L.E. Carpenter shall modify the documents to conform to NJDEP's comments and resubmit them to NJDEP.

45. Within fourteen (14) calendar days after receipt of NJDEP's written approval of the letter of credit, the trust agreement, and the certification of acknowledgement, L.E. Carpenter shall:

a. Obtain and provide to NJDEP the irrevocable letter of credit in the amount of $1,000,000.

b. Establish the irrevocable standby trust fund and deposit an initial amount of $1,000 into the irrevocable standby trust fund; and

c. Submit an originally signed duplicate of the trust agreement to NJDEP accompanied by the certification of acknowledgement.

46. L.E. Carpenter shall maintain the letter of credit and the standby trust fund until NJDEP notifies the issuing institution and the trustee in writing that either L.E. Carpenter performed all of its obligation imposed by this Administrative Consent Order to NJDEP's satisfaction or has substituted other financial assurance acceptable to NJDEP. In the event that NJDEP determines that L.E. Carpenter has failed to perform any of its obligations under this Administrative Consent Order, NJDEP may draw on the letter of credit; provided, however, that before any draw can be made, NJDEP shall notify L.E. Carpenter in writing of the obligation(s) which it has not performed, and L.E. Carpenter shall have a reasonable time, not to exceed fourteen (14) calendar days, to perform such obligation(s).

47. At any time, L.E. Carpenter may apply to NJDEP to substitute other financial assurances in a form, manner and amount acceptable to NJDEP.

C. Cost Review

48. Beginning three hundred sixty-five (365) calendar days after the effective date of this Administrative Consent Order and annually thereafter on that same calendar day, L.E. Carpenter shall submit to NJDEP a detailed review of all costs required for L.E. Carpenter's compliance with this Administrative Consent Order. This cost review shall include all monies spent to date pursuant to this Administrative Consent Order, the estimated cost of all future expenditures required to comply with this Administrative Consent Order (including any operation and maintenance costs), and the reason for any changes from the previous cost review submitted by L.E. Carpenter.

49. At any time after L.E. Carpenter submits the first cost review, pursuant to the proceeding paragraph, L.E. Carpenter may request approval from NJDEP to reduce the amount of the letter of credit to reflect remaining costs of performing its obligations under this Administrative Consent Order. If NJDEP grants written approval of the request, L.E. Carpenter may amend the amount of the existing letter of credit.

50. If the estimated cost of L.E. Carpenter with meeting its obligations in this Administrative Consent Order at any time exceeds the amount of the letter of credit, L.E. Carpenter shall, within fifteen (15) calendar days after receipt of written notice of NJDEP's determination, increase the amount the then existing letter of credit so that it is equal to the estimated cost as determined by NJDEP.

D. Oversight Cost Reimbursement

51. Within thirty (30) calendar days after receipt from NJDEP of an itemized accounting of its costs incurred in connection with its oversight functions of Administrative Consent Order for a fiscal year, or any part thereof, L.E. Carpenter shall submit to NJDEP a certified check payable to the "Treasurer, State of New Jersey" for the full amount of NJDEP's oversight costs.

a. For the purposes of this paragraph 51, oversight costs shall include, but not be limited to, hourly rates and hours worked by each individual and fringe benefits and overhead for monitoring L.E. Carpenter's compliance with this Administrative Consent Order, reviewing and presenting comments to L.E. Carpenter on materials submitted by L.E. Carpenter, and conducting on site inspections; sampling and analysis costs; and copy costs. NJDEP shall not act unreasonably in incurring any such oversight costs.

b. L.E. Carpenter agrees to pay NJDEP oversight costs pursuant to this paragraph 51 not to exceed $15,000 ("annual allotment") per fiscal year (July 1 - June 30) for a total not to exceed $75,000 for all oversight costs under this Administrative Consent Order. The aforesaid limitation on oversight costs of $75,000 applies to L.E. Carpenter's agreement

with regard to this Administrative Consent Order. However, NJDEP expressly reserves the right to take whatever action it deems necessary to seek reimbursement of any additional costs in connection with its oversight function of this Administrative Consent Order which exceed the amounts paid by L.E. Carpenter pursuant to this Administrative Consent Order for which L.E. Carpenter may be liable. Any such action taken by NJDEP shall not be encompassed within this Administrative Consent Order. L.E. Carpenter reserves any rights it may have to contest any such actions by NJDEP and said rights shall not be limited by any provision of this Administrative Consent Order.

c. If in any fiscal year NJDEP expends less than the annual allotment, the difference between the annual allotment and the amount expended shall be carried over and added to the annual allotment for the succeeding fiscal year to establish an increased allotment for that succeeding fiscal year.

d. If in any fiscal year NJDEP expends and presents an itemized accounting of oversight costs greater than the annual allotment, L.E. Carpenter shall pay NJDEP the excess over the annual allotment by August 1 in the succeeding fiscal years up to the annual allotment for each fiscal year until all oversight costs not to exceed $75,000 are paid to NJDEP. In no event does L.E. Carpenter agree to pay more than $15,000 for NJDEP's oversight costs in any one (1) fiscal year.

V. FORCE MAJEURE

52. If any event occurs which L.E. Carpenter believes will or may cause delay in the achievement of any provision of this Administrative Consent Order, L.E. Carpenter shall notify NJDEP, in writing, within seven (7) calendar days of the delay or anticipated delay, as appropriate, referencing this paragraph and describing the anticipated length of the delay, the precise cause or causes of the delay, any measures taken or to be taken to minimize the delay and the time required to take any such measures to minimize the delay. L.E. Carpenter shall take all necessary action to prevent or minimize any such delay.

53. If NJDEP finds that: (a) L.E. Carpenter has complied with the notice requirements of the preceding paragraph; and (b) that any delay or anticipated delay has been or will be caused by fire, flood, riot, strike or other circumstances beyond the control of L.E. Carpenter, NJDEP shall extend the time for performance hereunder for a period no longer than the delay resulting from such circumstances. Approval for any request for any extension shall not be unreasonably withheld. If NJDEP determines that either L.E. Carpenter has not complied with the notice requirements of the preceding paragraph, or the event causing the delay is not beyond the control of L.E. Carpenter, failure to comply with the provisions of this Administrative Consent Order shall

constitute a breach of the requirements of this Administrative Consent Order. The burden of proving that any delay is caused by circumstances beyond the control of L.E. Carpenter and the length of any such delay attributable to those circumstances shall rest with L E. Carpenter. Increases in the cost or expenses incurred by L.E. Carpenter, which are both unreasonable and significant, in fulfilling the requirements of this Administrative Consent Order shall not solely be a basis for an extension of time. Delay in an interim requirement shall not automatically justify or excuse delay in the attainment of subsequent requirements. All determinations under this Paragraph shall be in writing and accompanied by specific findings.

VI. GENERAL PROVISIONS

54. This Administrative Consent Order shall be binding on L.E. Carpenter, its principals, directors, officers, agents, successors, assigns, and any trustee in bankruptcy or receiver appointed pursuant to a proceeding in law or equity.

55. All work conducted pursuant to this Administrative Consent Order shall be performed in accordance with prevailing professional standards.

56. All actions performed by L.E. Carpenter in implementing this Administrative Consent Order shall be in compliance with all applicable Federal, State and local laws and regulations, including, but not limited to, the National Contingency Plan, 40 C.F.R. Part 300, 50 Fed. Reg. 47911. L.E. Carpenter shall be responsible for obtaining all necessary permits, licenses and other authorizations.

57. All appendices referenced in this Administrative Consent Order, as well as the RI Report, the FS Report, and all other reports, work plans and documents required under the terms of this Administrative Consent Order are, upon approval by NJDEP, incorporated into this Administrative Consent Order by reference and made a part hereof.

58. L.E. Carpenter shall make available to NJDEP all data and information, including raw sampling and monitoring data, concerning pollution at and/or emanating from the site.

59. L.E. Carpenter shall make available to NJDEP all technical records and contractual documents maintained or created by L.E. Carpenter or its contractors in connection with this Administrative Consent Order.

60. L.E. Carpenter shall preserve, during the pendency of this Administrative Consent Order and for a minimum of six (6) years after its termination, all non-privileged data, records and documents in their possession or in the possession of their employees, or contractors which relate in any way to the implementation of work under this Administrative Consent Order, despite any document retention policy to the contrary. After

this six (6) year period, L.E. Carpenter shall notify NJDEP within thirty (30) calendar days prior to the destruction of any such documents. If NJDEP requests in writing that some or all of the documents be preserved for a longer period, L.E. Carpenter shall comply with that request. Upon request by NJDEP, L.E. Carpenter shall make available to NJDEP such non-privileged records or copies of any such non-privileged records.

61. No obligations imposed by this Administrative Consent Order, with the exception of paragraphs 37 and 38, are intended to constitute a debt, damage claim, penalty or other civil action which should be limited or discharged in a bankruptcy proceeding. All obligations imposed by this Administrative Consent Order shall constitute continuing regulatory obligations imposed pursuant to the police powers of the State of New Jersey, intended to protect human health or the environment.

62. In addition to NJDEP's statutory and regulatory rights to enter and inspect, L.E. Carpenter shall allow NJDEP and its authorized representatives access to the site at all times upon the giving of reasonable notice by NJDEP to L.E. Carpenter, for the purpose of monitoring L.E. Carpenter's compliance with this Administrative Consent Order.

63. NJDEP reserves the right to require L.E. Carpenter to take additional actions should NJDEP determine that such actions are necessary to protect human health or the environment. L.E. Carpenter reserves the rights it may have to contest or defend itself against additional actions taken by NJDEP. Nothing in this Administrative Consent Order shall constitute a waiver of any statutory right of NJDEP pertaining to any laws of the State of New Jersey, should NJDEP determine that such measures are necessary.

64. L.E. Carpenter shall not construe any informal advice, guidance, suggestions, or comments by NJDEP or by persons acting on behalf of NJDEP as relieving L.E. Carpenter of its obligation to obtain written approvals as may be required herein, unless such advice, guidance, suggestions, or comments by NJDEP shall be submitted in writing to L.E. Carpenter.

65. No modification or waiver of this Administrative Consent Order shall be valid except by written amendment to this Administrative Consent Order duly executed by L.E. Carpenter and NJDEP.

66. L.E. Carpenter hereby consents to and agrees to comply with this Administrative Consent Order which shall be fully enforceable as an Order in the New Jersey Superior Court upon the filing in a summary manner for compliance pursuant to N.J.S.A. 13:1D-1 et seq., and the Water Pollution Control Act, N.J.S.A. 58:10A-1 et seq.; provided, however, L.E. Carpenter reserves its right to defend itself in any summary proceeding initiated by NJDEP or the State of New Jersey pursuant to this paragraph.

67. L.E. Carpenter agrees not to contest the authority or jurisdiction of NJDEP to issue this Administrative Consent Order and also agrees not to contest the terms of this Administrative Consent Order except as to interpretation of the same in any action to enforce its provisions.

68. The requirements of this Administrative Consent Order shall be deemed satisfied upon receipt by L.E. Carpenter of written notice from NJDEP that L.E. Carpenter has demonstrated, to the satisfaction of NJDEP, that all terms of this Administrative Consent Order have been completed.

69. This 1986 Administrative Consent Order shall supersede the January 29, 1982 Administrative Consent Order and the Addendum of February 24, 1983 except that all requirements for L.E. Carpenter contained in L.E. Carpenter's proposal entitled, "Ground-Water Decontamination Plan," dated October 31, 1983, as approved with conditions by NJDEP on January 26, 1984 (pursuant to the January 29, 1982 Administrative Consent Order and the Addendum of February 24, 1983) are incorporated herein by reference and shall continued in full force and effect until NJDEP otherwise notifies L.E. Carpenter in writing.

70. L.E. Carpenter shall use its best efforts to gain access to property not owned by it, where necessary, to comply with this Administrative Consent Order.

71. This Administrative Consent Order shall become effective upon the execution hereof by all parties.

BY THE AUTHORITY OF
GEORGE G. MCCANN
ACTING DIRECTOR
DIVISION OF WATER RESOURCES

DATE: SEP 26 1986

BY: James E. Mumman
James E. Mumman
Acting Assistant Director
Enforcement Element

L. E. CARPENTER AND COMPANY

DATE: Sept. 10, 1986

BY: _____

NAME: Louis G. Felfoldy

TITLE: Vice President, Manufacturing

LIST OF APPENDICES

APPENDIX A

Remedial Investigation

Scope of Work

APPENDIX A

REMEDIAL INVESTIGATION

SCOPE OF WORK

I. REQUIREMENTS OF REMEDIAL INVESTIGATION

A. Fully characterize and delineate the horizontal and vertical extent of all wastes and other materials which are, or may be, the source(s) of pollution at the site. This includes, but not limited to, the sludges and waste remaining on site in or in the vicinity of the waste impoundment (refer to paragraph 9 of the FINDINGS of this Administrative Consent Order).

B. Fully determine the nature, type and physical states of soil, surface-water and ground-water pollution at and/or emanating from the site.

C. Fully determine the horizontal and vertical extent of soil, sludges, waste, surface-water, and ground-water pollution at and/or emanating from the site.

NOTE: This determination requires, among other items, the installation of monitor wells which establishes ground water free of immiscible chemical compounds and non-detectable or background concentrations of dissolved chemical compounds. These wells shall be installed within a reasonable distance of known areas of ground-water pollution.

D. Fully determine the horizontal and vertical extent of any on site PCB contamination of the soils.

E. Fully determine migration paths of pollutants through air, soil, ground water, surface water, sediment and local potable wells.

F. Fully determine impact of the pollution on human health and the environment.

G. Collect, present and discuss all data necessary to adequately support the development of the feasibility study and the selection of a remedial action alternative that will adequately remediate the adverse impacts of the pollution on human health and the environment.

II. CONTENTS OF REMEDIAL INVESTIGATION WORK PLAN

IMPORTANT NOTE: All of the following items shall be included in the RI Work Plan. If any of the items have previously been submitted or completed, it shall be so stated in the RI

Work Plan. For these items, the following shall be included in the RI Work Plan:

- Description of items submitted and/or summary of investigation completed;
- Date(s) of submission or completion; and
- Any known changes or new information developed since submission or completion.

NJDEP will determine the extent to which prior submissions or completions may satisfy specific items required by this Scope of Work.

A. A statement of requirements for the remedial investigation pursuant to Section I above.

B. A complete site history including:

1. A description, including dates, of all uses and activities on the site, both past and present;
2. A list of all raw materials used and products made, past and present;
3. A description of all past and present disposal practices as well as the location of all known and suspected pollution sources;
4. All historical site plans and facility as-built construction drawings available to or in L.E. Carpenter's possession;
5. All aerial photographs of the site in possession of L.E. Carpenter;
6. A site water budget water input use, distribution and discharge;
7. A site map showing locations of all under and above ground storage tanks, lines and containments;
8. A detailed listing of all tank contents, age, construction materials, repairs, accidents or incidents; and
9. Provide all tank test data confirming status of tanks and lines.

C. A detailed schedule for all remedial investigation activities set forth in this Administrative Consent Order and in this Scope of Work including:

1. Dates for submission of all required permit applications;

2. Dates for start up and completion of all field investigations; and

3. Dates for submission of all reports.

D. Curriculum vitae of all key personnel who will participate in the remedial investigation.

E. A summary, review and evaluation of all existing environmental data relevant to the site.

F. Field Sampling Plan

1. Waste Characterization

a. Specify number, type and frequency of samples required to accurately characterize all solid wastes in tanks, drums, lagoons/impoundments, piles or otherwise at the site. This shall include, but not be limited to, delineating the extent of all wastes disposed of in the the impoundment, referenced in paragraph 2 of the FINDINGS of this Administrative Consent Order, and which remain on site.

b. Explain the type of data which will be collected, justification for collection, and intentions for use of the data.

c. Specify location (on site map) and depths of proposed soil borings, test pits and other sampling points.

d. Specify EPA analytical procedures, including test parameters for waste analyses.

e. Specify chain-of-custody procedures.

f. Specify the name of the State certified laboratory L.E. Carpenter will use for analysis of all samples.

g. Specify when Tier I and Tier II Quality Assurance Deliverable Requirements will be submitted in accordance with Appendix C.

h. Specify all Federal, State and local permits required.

i. Specify investigation procedures in accordance with the following:

i. Obtain drilling permits for all soil borings pursuant to N.J.A.C. 58:4A-14;

ii. Install soil borings under direct supervision of a New Jersey licensed well driller and a qualified geologist;

iii. Decontaminate soil boring and sampling equipment between individual samples and borings according to the approved decontamination plan;

iv. Classify wastes according to N.J.A.C. 7:26;

v. Use field instrumentation (PID, FID) to analyze soil samples in the field;

vi. Analyze waste samples to quantify and determine type of pollutants; and

vii. Permanently seal all soil borings using a certified well sealer.

2. Soil Investigation

a. Specify number, type and frequency of samples required to accurately define the horizontal and vertical extent of soil pollution at and/or emanating from the site, including, but not limited to:

i. Defining the horizontal and vertical extent of polychlorinated biphenyls (PCB). This sampling shall address the potential for PCB discharges into ground water and the potential for direct human contact with PCB contamination.

ii. Delineating the vertical and horizontal extent of soil contamination at the location of the former subsurface waste disposal systems (see Appendix B, Map I); and

iii. Delineating the vertical and horizontal extent of soil contamination in the area encompassing the tank farm, others on site underground tanks and all underground associated lines (see Appendix B, Map II).

b. Explain the type of data which will be collected, justification for collection, and intention for use of the data.

c. Specify location (on site map) and depths of proposed soil borings, test pits and other sampling points.

d. Specify EPA analytical procedures, including test parameters for soils analyses.

e. Specify chain-of-custody procedures.

f. Specify procedures to collect soil samples.

g. Specify the name of the State certified laboratory L.E. Carpenter will use for analysis of all samples.

h. Specify when Tier I and Tier II quality assurance deliverable requirements will be submitted pursuant to Appendix C, which is attached hereto and made a part hereof.

i. Specify all Federal, State and local permits required.

j. Specify investigation procedures in accordance with the following:

i. Obtain drilling permits for all soil borings pursuant to N.J.A.C. 58:4A-14;

ii. Install soil borings under direct supervision of a New Jersey licensed well driller and a qualified geologist;

iii. Decontaminate soil boring and sampling equipment between individual samples and borings according to the approved decontamination plan;

iv. Classify soil according to a standard approved system e.g. Birmeister, unified;

v. Analyze particle size in laboratory on representative samples to confirm field identification;

vi. Use field instrumentation (PID, FID) to screen and analyze soil samples in the field;

vii. Analyze soil samples to qualify and determine type of pollutants; and

viii. Permanently seal all soil borings using a certified New Jersey well sealer and New Jersey approved sealing material.

3. Ground Water

a. Install ten (10) ground-water monitoring wells at locations on site and off site in accordance with the following requirements:

i. Shallow wells shall be installed at the general locations described below and illustrated on the map in Appendix B, Map II:

1. Three (3) shallow overburden wells in the vicinity of Well #1, on site;

2. One (1) shallow overburden well northwest of Well #6, on site;

3. One (1) shallow overburden well, northeast of Well #3, off site;

4. One (1) shallow overburden well immediately south of the tank farm on site;

5. One (1) shallow well east of the facility's drainage ditch (on Airco's property); this well will indicate if contaminants have migrated from the site;

ii. The actual locations of all shallow wells described in paragraph II.F.3.a.i. shall be identified and staked in the field by a NJDEP geologist prior to their installation.

iii. Installation of at least three (3) deep overburden wells to assist in determining the vertical extent of contamination.

iv. The actual locations of the deep overburden wells shall be determined after the installation and sampling of the shallow wells described in paragraph II.F.3.a.i. of the Scope of Work. This determination shall be made by L.E. Carpenter's consultant with final locations to be approved and field verified by NJDEP geologist prior to the wells' installation.

b. Specify number, locations (on site map) and designs of existing and proposed piezometers, monitor wells, potable wells and other sampling points required to accurately define the horizontal and vertical extent of ground-water pollution at and/or emanating from the site, including, but not limited to, the following:

i. The potential impact upon the ground water of the on site tank farm, other on site tanks and associated lines. This investigation may require the installation of additional ground-water monitor wells.

ii. The possibility of underflow of contaminants beneath the Rockaway River. This investigation shall include, at a minimum, the installation of two (2) monitor well clusters consisting of shallow and deep monitor wells.

iii. The horizontal and vertical ground-water flow direction(s) using elevations of surface water and elevations of ground water free of floating immiscible chemical compounds. The investigation may require the installation of additional monitor wells to establish groundwater flow direction(s).

iv. The possibility that the abandoned sewer line located off site is acting as a conduit for the migration of pollutants in the ground water; the plan shall include the installation and sampling of shallow ground-water monitor well(s).

IMPORTANT NOTE 1: If, after the installation and testing of the monitor wells required by paragraph II.f.3. of this Scope of Work, the ground-water pollution is not fully delineated, as required in Section I of this Scope of Work (Requirements of Remedial Investigation), and/or ground-water flow direction is not fully defined, additional ground-water monitor wells shall be installed by L.E. Carpenter to accomplish these requirements.

c. Explain the type of data which will be collected, justification for collection and intentions for use of the data.

d. Specify number, type and frequency of ground-water samples required to accurately define the horizontal and vertical extent of ground-water pollution at and/or emanating from the site. This plan shall include, but not necessarily be limited to, all on site and off site ground-water monitor wells installed by L.E. Carpenter, and the abandoned on site production well.

e. Analyze each water sample collected pursuant to paragraphs c and d above in accordance with the requirements of Appendix C for the following parameters: the 129 priority pollutants designated by the USEPA (water samples to be analyzed for metals will be filtered in the field immediately after collection and prior to acidification), and the following organic compounds: butyl benzene, cumene, decane, heptane, mesitylene, 1,2,4-trimethyl benzene, 1,2,3-trimethyl benzene, 1-ethyl 3-methyl benzene, 1,2,3,4-tetramethyl benzene, 1,2,3,5-tetramethyl benzene, 1,2-diethyl benzene, nonane, styrene, p-xylene, m-xylene, o-xylene. The analyses shall also include identification of organic nonpriority pollutant compounds in each sample according to the following procedures:

i. For each sample, the contractor shall perform a forward library search of the Environmental

Protection Agency/National Institute of Health/-National Bureau of Standards (EPA/NIH/NBS) mass spectral library to tentatively identify 15 nonpriority pollutant compounds of the greatest apparent concentration in the purgeable organic fraction of the USEPA Priority Pollutant scan.

ii. For each sample, the contractor shall perform a forward library search of the EPA/NIH/NBS mass spectral library to tentatively identify 10 nonpriority pollutant compounds of the greatest apparent concentration in the acid extractable organic fraction of the USEPA Priority Pollutant scan.

iii. For each sample, the contractor shall perform a forward library search of the EPA/NIH/NBS library to tentatively identify 15 nonpriority pollutant compounds of the greatest apparent concentration in the base/neutral organic fraction of the USEPA Priority Pollutant scan.

f. Specify USEPA analytical procedures.

g. Specify procedures to collect ground water and to preserve for laboratory analyses, samples from monitor wells and from on site abandoned production well.

h. Specify the chain-of-custody procedures.

i. Specify when Tier I and Tier II quality assurance deliverable requirements will be submitted in accordance with Appendix C.

j. Specify the name of the State certified laboratory L.E. Carpenter will use for analysis of all samples.

k. Specify all required Federal, State and local permits needed under this section of Appendix A (Ground Water).

l. Specify investigative proceedings in accordance with the following:

i. A qualified hydrogeologist with substantial experience in ground-water pollution investigations shall oversee all site activities;

ii. Obtain well drilling permits pursuant to N.J.S.A. 58:4A-14; and

iii. Drill all wells under the direct supervision of a New Jersey licensed well driller and a qualified hydrogeologist.

IMPORTANT NOTE 2: Improperly constructed monitor wells can compound a pollution problem. Therefore, particular attention shall be given to the details of these specifications. NJDEP has the authority to shut down a drilling operation which is not adhering to the approved procedures. Data derived from improperly constructed wells shall not be accepted by NJDEP.

iv. Install wells in accordance with NJDEP Monitor Well Specifications to be provided to L.E. Carpenter prior to commencement of drilling operations.

v. Notify NJDEP at least two (2) weeks prior to commencement of any field related activities.

vi. Collect split spoon samples, during drilling through overburden, according to ASTM Standard Penetration Methods, ASTM D1 586-67, at five (5) foot intervals, at changes in soil strata, and at all zones which show obvious signs of pollution; with a specific number of drilling locations including continuous split spoon samples to fully define subsurface statigraphy.

vii. Collect sufficient rock cores according to ASTM Diamond Core Drilling Method, ASTM 2113-70, during the drilling of bedrock monitoring wells to obtain a thorough understanding of fracture patterns beneath the site.

viii. Retain all soil and rock samples for future reference and/or analysis.

ix. Well samples shall <u>not</u> be collected sooner than fourteen (14) calendar days after the installation and development of the monitor wells.

x. Complete sufficient pumping and packer tests to adequately define aquifer characteristics and develop recovery well design for aquifer restoration.

xi. Complete geophysical surveys and ground-water modeling.

xii. Survey all well casings, to the nearest hundredth (0.01) foot above mean sea level and horizontally to an accuracy of one tenth (1/10th) of a second latitude and longitude by a New Jersey licensed land surveyor. A water level measurement point should be etched into the well casing to

facilitate accurate, reproducible water level measurements.

xiii. Take precautions in surveying the newly installed wells so that the elevations obtained will accurately integrate into the existing elevations of the previously installed wells and will be tied to the same datum plane.

xiv. Decontaminate drilling and sampling equipment after each drilling and sampling event according to the approved decontamination plan.

xv. Collect on a quarterly basis the following information:

1. Synoptic ground-water elevation measurements from all monitoring wells installed on site and off site by L.E. Carpenter and from the site's abandoned production well;

IMPORTANT NOTE 3: Water level measurements shall be obtained by conventional methods without the use of Geomon Sampling Devices.

2. The actual thickness of the immiscible chemical compounds within all the above specified wells; and

3. Surface-water elevations at a minimum of three (3) locations in the Rockaway River.

IMPORTANT NOTE 4: Water level elevations shall be collected prior to the purging of the wells as required for ground-water sampling.

4. <u>Surface-Water and Sediment Investigation</u>

a. Specify number, type and frequency of samples required to adequately determine the horizontal and vertical extent of surface-water and sediment pollution at and/or emanating from the site. Surface water shall include, but not be limited to, the Rockaway River and any surface water in streams, trenches, pits, culverts, ditches and drainages.

b. Explain the type of data which will be collected, justification for the collection of the data, and intentions for use of the data.

c. Specify locations (on site map) of surface-water and sediment sample points.

d. Specify EPA analytical procedures, including test parameters, for surface-water and sediment analyses.

e. Specify chain-of-custody procedures.

f. Specify the name of the State certified laboratory L.E. Carpenter will use for analysis of all samples.

g. Specify all required Federal, State and local permits required.

h. Specify when Tier I and Tier II Quality Assurance Deliverable Requirements will be submitted in accordance with Appendix C.

i. Specify investigative procedures in accordance with the following:

   i. Analyze surface water and sediment samples to determine the presence of pollutants and sediment according to the approved sampling plan;

   ii. Decontaminate sampling equipment between sampling events according to the approved decontamination plan; and

   iii. Collect surface-water and sediment samples, including sample preservation requirements, in accordance with Field Procedures Manual for Water Data Acquisition, Division of Water Resources, New Jersey Department of Environmental Protection, 1983.

5. Ambient air monitoring

a. Characterize baseline air quality conditions on and in the vicinity of the site, and to assist in identifying present air quality hazards related to the site.

b. Develop a field screening protocol including:

   i. Wellhead monitoring and soil sample emissions analysis;

   ii. Any specific air quality concerns in the ultimate selection of a remedial alternative;

   iii. Any adverse air quality impacts that may be associated with the selected remedial action;

   iv. Enable the implementation of measures to control any adverse air quality impacts that may occur during the course of remedial activities (for

example, to design and implement a construction related air program to monitor ambient levels);

v. Specify all Federal, State and local permits required; and

vi. Specify investigation procedures.

G. A health and safety plan based on EPA protocols for on site personnel to minimize the risk of personal injury, illness and potential environmental impairment associated with the site investigation, including:

1. Listing of personal protective equipment (including respiratory protection) to be used and guidelines for their use, including manufacturer, model, duration of safety period, and any required certification documentation;

2. Listing of safety equipment (including manufacturer, expiration date and model) to be used, such as fire extinguishers, portable eye wash stations, air monitoring equipment, gamma survey instrument, etc. (equipment shall meet OSHA standards or other acceptable industrial standards);

3. Contingency plans for emergency procedures, spill prevention/response, and evacuating plans;

4. On site monitoring for personnel safety (e.g., PID, FID);

5. Criteria for selecting proper level of personal protection;

6. Medical surveillance program for all on site personnel involved in remedial investigation;

7. Personal hygiene requirements;

8. Training program including training protocol; and

9. Special medical procedures to be available at site.

10. Telephone numbers of nearest emergency medical facility, fire company, local and state police and rescue ambulance squad(s).

H. Equipment Decontamination Plan

1. List the items to be decontaminated.

a. Drilling equipment, paying particular attention to down hole tools, back of drilling rig and drilling rods racks;

b. Sampling equipment including split spoons, shelby tubes, trowels, spatulas, etc.;

c. Bailers, pumps, hoses, etc.; and

d. Personnel clothing.

2. Procedures for decontamination:

a. All field sampling equipment shall be laboratory cleaned, wrapped and dedicated to a particular sampling point, unless written permission for field cleaning is obtained from NJDEP prior to collection of any samples.

b. Field cleaning of well casing, well screening, drill rigs, and drilling equipment shall consist of a manual scrubbing to remove foreign material and steam cleaning inside and out until all traces of oil and grease are removed; this material shall then be stored in such a manner to preserve it in this pristine condition.

c. Split spoons, bailers, pumps etc.

- nonphosphate detergent
- tap water rinse
- 10% nitric acid rinse*
- distilled/deionized water rinse
- acetone (pesticide grade) rinse
- total air dry or nitrogen blow out

* Only if sample is to be analyzed for metals

d. Hoses

- steam cleaning
- alconox scrub
- alconox flushing

e. The chain of custody for sampling events shall begin with the cleaning of the sampler. Wherever possible, samplers should be numbered in a manner that will not affect their integrity, wrapped in a material (i.e. aluminum foil) that has either been autoclaved or cleaned in the same manner as the sampler.

f. The use of distilled water commercially available in five (5) gallon polyethylene carboys is acceptable for sampler decontamination provided that it is also deionized. Use of this water is unacceptable for field and trip blanks unless it has been demonstrated to be analyte free by laboratory analysis.

IMPORTANT NOTE 5: The use of dedicated sampling equipment is recommended.

III. CONTENTS OF REMEDIAL INVESTIGATION REPORT

A. Presentation of Data

1. Results of all analyses, including raw data, laboratory data sheets and the required quality assurance documentation.

2. Summary table(s) of all analyses.

3. Stratigraphic logs including grain size and field instrument readings detected during drilling for each soil boring and monitor well.

4. As-built construction diagrams for each soil boring and monitor well.

5. Well casing elevations.

6. Static water level elevations including depth to water and feet above mean sea level.

7. All support data including graphs, equations, references, raw data, etc..

B. Maps

1. Site Map

   a. Property boundaries

   b. Structures and improvements (e.g. above and below ground tanks, impoundments, leachfield(s), septics, dry wells, lagoons, infiltration galleries, waste disposal systems, etc.)

   c. Surface-water bodies

   d. Site and adjacent land use

   e. Topography indicating two (2) foot contours

   f. All underground piping and utilities, tanks and associated lines.

   g. Scale and orientation

2. Sample Location Map(s)

   a. Monitor well locations and casing elevations

   b. Sample collection locations

   c. Soil boring locations

3. Soil quality contour map and cross section(s)

4. Ground-water elevation contour map(s)

5. Ground-water quality contour map(s) and cross section(s)

6. Soil quality contour map(s) and cross section(s) - (where appropriate)

C. Discussion of Data

1. Direction and rate of ground-water flow in the aquifer(s), both horizontally and vertically.

2. Levels of soil, surface-water and ground-water pollution as compared to applicable standards and guidelines, or background levels where pertinent.

3. Extent of soil, surface-water and ground-water pollution both off site and on site.

4. Pollution behavior, stability, biological and chemical degradation, mobility and any other relevant factors pertinent to the investigation.

5. Projected rate(s) of pollution movement.

6. Identification of pollution sources.

7. Justification for and identification of critical pollutants.

D. Assessment of Impact of Pollution on Human Health and the Environment

1. Identification of human receptors in the paths of pollution migration; mobility of pollutants and specific routes to target organs (e.g., liver).

2. Identification of the receiving media and/or ecological groups and migration pathways of critical pollutants.

3. Toxicology of each critical pollutant (acute and chronic toxicity for short and long term exposure, carcinogenicity, mutigenicity, teratogenicity, synergistic and/or antagonistic associations, aquatic toxicity, ecology impacts on flora and fauna, etc.).

4. Migration potential and environmental fate of each critical pollutant in site-specific terms (e.g., attenuation dispersion and biodegration are factors in the ground-water pathway).

5. Evaluation of potential for biomagnification and/or bioaccumulation of critical pollutants in the food chain.

E. Recommendations for Additional Investigations

1. Soil

2. Ground Water

3. Surface Water and Sediment

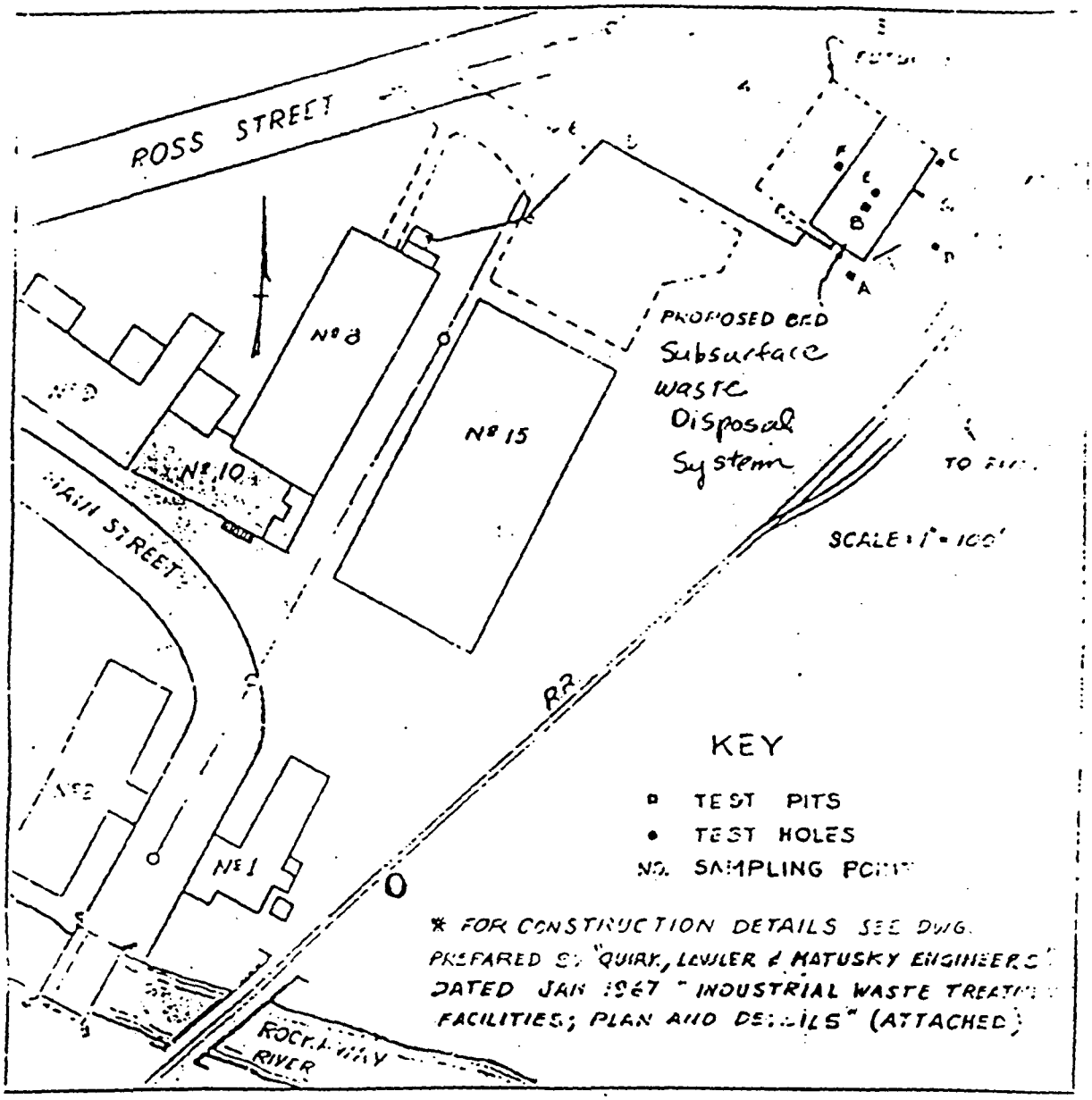
4. Air

APPENDIX B

Site Maps

MAP II

(SKETCH) *

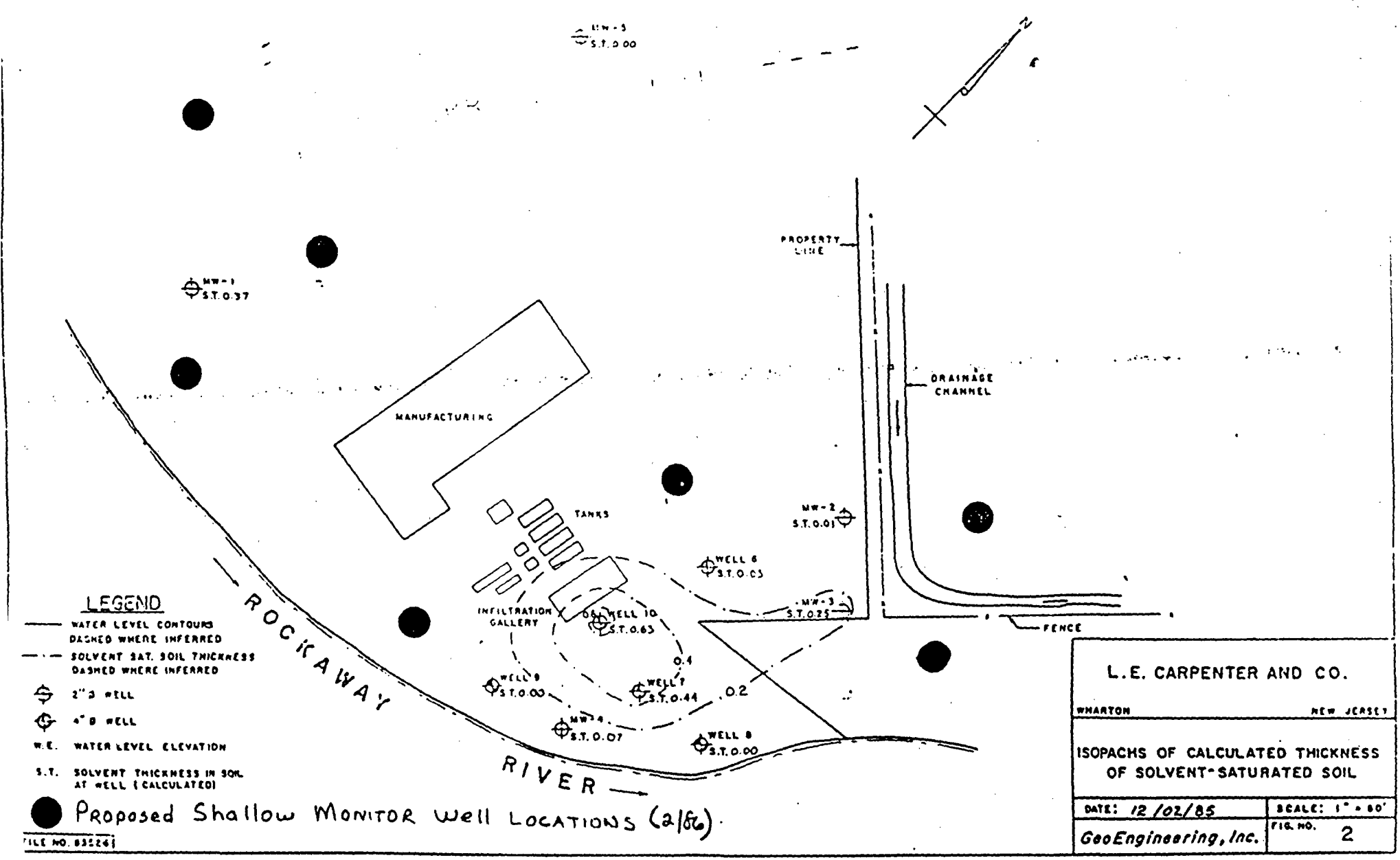


SHOW ON SKETCH: Dimensions and location of property, and building and proposed system, elevation of building sewer at building, at top of test hole and at other points as required to establish area grade, area for future expansion, distances of units of disposal system from dwelling, or other building, boundary lines, trees, stream, well, septic tank and other disposal units. Also show location of test holes.

The owner and contractor agree to build the system in accordance with the local sanitary code and the standards promulgated by the New Jersey State Department of Health under the provisions of Chapter 199, Public Laws of 1954 and in accordance with the provisions of an ordinance entitled: "An Ordinance establishing a code to regulate and control the location, construction, use, maintenance, and method of emptying or cleaning individual sewage disposal systems, or other places used for the reception or storage of human excrement, the issuance of (licenses) (permits) and providing penalties for the violation thereof," adopted by the Board of Health of Montville Township

Owner .....

Contractor .....


MW-5
S.T. 0.00
N
PROPERTY LINE
MW-1
S.T. 0.37
DRAINAGE CHANNEL
MANUFACTURING
TANKS
MW-2
S.T. 0.01
WELL 6
S.T. 0.03
MW-3
S.T. 0.25
FENCE
INFILTRATION GALLERY
WELL 10
S.T. 0.63
0.4
WELL 9
S.T. 0.00
WELL 7
S.T. 0.44
0.2
MW-4
S.T. 0.07
WELL 8
S.T. 0.00
ROCKAWAY
RIVER
LEGEND
WATER LEVEL CONTOURS DASHED WHERE INFERRED
SOLVENT SAT. SOIL THICKNESS DASHED WHERE INFERRED
2" Ø WELL
4" Ø WELL
W.E. WATER LEVEL ELEVATION
S.T. SOLVENT THICKNESS IN SOIL AT WELL (CALCULATED)
Proposed Shallow Monitor Well Locations (2/86)
FILE NO. 83226
L.E. CARPENTER AND CO.
WHARTON NEW JERSEY
ISOPACHS OF CALCULATED THICKNESS OF SOLVENT-SATURATED SOIL
DATE: 12/02/85
SCALE: 1" = 80'
GeoEngineering, Inc.
FIG. NO. 2

MAP II

APPENDIX C

Quality Assurance

QUALITY ASSURANCE DELIVERABLE REQUIREMENTS

There are three parts to this Appendix. The first part outlines, according to sample/data type, frequency and use, the approximate percentage of samples for which the Tier I and Tier II quality assurance deliverables are required. The second part is a copy of the Tier I Quality Assurance Deliverable Requirements. The third part is a copy of the Tier II Quality Assurance Deliverable Requirements. Appendix C applies to all data gathered after the effective of this Administrative Consent Order.

CRITERIA FOR QUALITY ASSURANCE DELIVERABLE REQUIREMENTS

	TIER I	TIER II
A. Remedial Investigation:		
1. one phase RI	100%	
2. multiphase RI		
a. initial sampling	100%	
b. subsequent sampling	10% or minimum of one monitor well or sampling event	90%
B. Remedial Action:		
1. monitoring of decontamination events		
a. initial sampling	100%	
b. subsequent sampling	25%	75%
2. sampling to support proposal to terminate decontamination system	100%	
3. post cleanup/removal soil sampling to determine if any additional cleanup/ removal is required	100%	
C. Other Site Specific Considerations:		

C. Other Site Specific Considerations:

1. potable water

a. initial sampling	100%	
b. subsequent sampling	25%	75%

New Jersey Department of Environmental Protection

Tier I Quality Assurance and

Generalized Reporting Format Deliverable Requirements

GENERALIZED REPORTING FORMAT PACKAGE

The elements of data reporting required in the Final Data Report must be reported and delivered to NJDEP for each environmental and waste sample submitted. It is understood data reporting format for particular laboratories may vary due to problems with software compatibility. The document that follows is a generalized data reporting format that includes each item required. The submitting laboratory may alter the reporting format to make it compatible with their computer systems; however, the substantive data required to meet the intent of this package shall not change. Six copies of the Final Data Report must be submitted. The data may be used by NJDEP in civil and/or criminal litigation, therefore the strictest adherence to chain of custody protocol, document control, and quality assuranced procedures is required. The Submitting laboratory must obtain approval of their specific reporting format from NJDEP prior to initiation of measurements. The contract laboratory is required to furnish NJDEP and the prime contractor a weekly progress report on sample status. The laboratory must adhere to a 40 day turnaround time from date of sample receipt.

All reference to a specific IFB document shall be that specific document or a more recent officially issued revision. Earlier editions of the specific IFB stated within this document shall not be used.

The hierarchy of deliverable requirements to which a laboratory will be held is:

1. Specific contractual agreements and Generalized Reporting Package.

2. Official analytical methodology.

3. Laboratory SOP.

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9. O-3: Soil Matrix Spike/Matrix Spike Duplicate Recovery
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11. O-5: GC/MS Tune Summary: Extractable Organics
12. O-6: Initial Calibration Data: Volatile Organics
13. O-7: Initial Calibration Data: Extractable Organics
14. O-8: Continuing Calibration Check: Volatile Organics
15. O-9: Continuing Calibration Check: Extractable Organics
16. O-10: GC/MS Surrogate Recovery Data
17. O-11 through O-13: Non-Targeted Analyte Summary
18. P-1: Pesticide/PCB Standard Summary
19. P-2: Pesticide/PCB Identification
20. M-1: Analytical Results and Quality Assurance Data: Metals
21. M-2: Initial and Continuing Calibration Verification: Metals
22. M-3: ICP Interference Check Sample Summary
23. M-4: Method of Standard Addition Results

24. D-1: 2, 3, 7, 8 - TCDD Data Report Form

25. D-2: 2, 3, 7, 8 - TCDD Partial Scan Conformation

26. D-3: 2, 3, 7, 8 - TCDD Initial Calibration Summary

27. D-4: 2, 3, 7, 8 - TCDD Continuing Calibration Summary

I. INSTRUCTIONS FOR REPORT FORMAT AND DELIVERABLES REQUIREMENTS

All samples must have a separate technical report wherein the document is bound at least in the upper left hand corner and all pages beyond the table of contents must be numbered. All tables and X-Y graphs must be set broad side, i.e. the open edge of the paper must be toward the reader. No uninitialled strikovers are allowed. The Data Package must include all the following information:

A. Title page - case name, field sample number, laboratory sample number, sample location, date, time of the sample collection, lab supervisor name and signature. Use Form G-1 or the equivalent.

B. Table of Contents - listing of all major sections of delivered document with referenced pages.

C. Sample Analysis Request Form - list the type of analyses are requested for the sample and all pertinent field information. Use Form G-2.

D. Chain of Custody Record - for every sample both laboratory and field chain of custody must be provided at the end of the final data report package (see Form G-3 with shuttle system, Form G-4 without shuttle system). The laboratory chain of custody must show the signatures of the Sample Custodian, Extraction Supervisors and Analytical Supervisors. It must clearly trace the movement of the sample through the laboratory by showing the relinquishing and receiving of the sample.

E. Laboratory Chronicle - dated sequence of sample movement through the laboratory for analysis and reanalysis, if required. This must be provided as a summary, in addition to the laboratory chain of custody. (Note: samples must be stored in a securely locked refrigerator at 4 C.) Use form G-5 or the equivalent.

The laboratory chronicle shall address:

- Receipt/refrigeration
- Preparation by fraction and re-extraction (of required)
- Analysis (reanalysis)
- Section Supervisor review and approval with signature
- QA/QC Officer review and approval with signature

F. Methodology Review - brief narrative outlining the essential points of each method used. The SOP must be previously approved by ~~DEP~~, and the methodology section must cite the approved SOP. Use Form G-6 or the equivalent.

G. Non-Conformance Summary Report - in appropriate narrative and tabular form, all data falling outside the QA criteria specified and approved in the QA plan as deliverable must be highlighted.

H. Quality Control Summary

1. Surrogate recovery summary
2. Matrix spike/matrix spike duplicate summary
3. Reagent blank summary
4. GC/MS tuning & mass calibration summary

I. Sample Data Package

1. Sample result summary and contract require detection limits.

   NOTE: The following information must be presented in the sequence listed here.

2. Sample chromatograms and mass spectral data
3. Quantitation reports
4. Library searches

J. Standard Data Package

1. Initial calibration
2. Continuing calibration
3. Standards chromatograms and quantitation reports

K. Raw QC Data Package

1. DFTPP and BFB Spectra
2. Reagent blank data
3. Matrix Spike/Matrix Spike Duplicate Chromatograms

II. REPORTING REQUIREMENTS AND DELIVERABLES FOR ORGANICS: VOLATILES, ACID AND BASE/NEUTRAL EXTRACTABLES

A. Targeted Analyte Summary - Record quantitative results (uncorrected for blank) MDLs, method blank results on Form 0-1 or the equivalent. Use the specific data reporting qualifiers listed below:

J: Indicates an estimated value. Use when a reported value meets the identification criteria but the result is less than the specified detection limit but greater than zero (eg: MDL=10, report 2J).

U or ND: Indicates a compound was analyzed for but not detected. If using U, report the minimum detection limit with the U (eg: 10U).

B: Indicates that the analyte was found in the blank as well as the sample. It indicates possible/probable blank contamination and alerts the data end-user.

Targeted analytes may include those in the current USEPA IFB of which the priority pollutants are a subset of the Hazardous Substance List required at a minimum. Report results to two significant figures. For rounding rules, follow the EPA Handbook of Analytical Quality Control in water and wastewater laboratories, EPA-600/4-79-019. The appropriate concentration units must be used, e.g., ug/l for water samples or ug/kg (dry weight basis) for soil/solid waste samples. Non-targeted compounds shall be included in the method blank summary if they occur.

B. Matrix Spike/Matrix Spike Duplicate - Record results on Form 0-2 and/or 0-3, or the equivalents. The percent recovery (%R) and relative percent difference (RPD) must be calculated. No further action is required by the laboratory. The %R and RPD may be used in the future by NJDEP to establish performanced based Q.C. limits. The limits shown on Forms 0-2 and 0-3 were taken from the current USEPA IFB the laboratory should meet the recovery and precision requirements as stated in this protocol.

C. GC/MS Tune Summary - Use Forms 0-4 and 0-5, or the equivalents. Criteria must be achieved once every 12 hour shift.

D. Calibration Curve Validation

1. Initial Calibration Curve - Use Forms 0-6 and 0-7, or the equivalents. Initial curves shall be verified in the following manner.

a. If current IFB format is used, the criteria as required in that document must be met.

b. If NJDEP format is used, at least a three point calibration curve shall be run. Individual response factors RFs (RF) and the average RF (RF) must be calculated. The percent relative standard deviation (%RSD) from the RF must be shown for all compounds, and should be less than 30% for all compounds. Major deviation from the 30% rule shall result in qualification or rejection of that fraction.

2. Continuing Calibration Curve Check - Use Forms 0-8 and/or 0-9, or the equivalents. The percent difference (%D) between the initial RF and the RF of the check standard is calculated for the calibration check compounds (CCC). For both IFB and NJDEP - reporting formats, the %D must be less than or equal to 25%. NJDEP will evaluate laboratory achievements in the following manner:

a. Volatile Organics - 0 out of 5 CCCs will be allowed to have a %D greater than 25%.

b. Semivolatile - 1 or 2 out of 13 CCCs will be allowed to have a %D greater than 25%, but less than 50%; the data will be acceptable with qualifications. Corrective action must be taken if 3 or more compounds are out of specifications. It is the responsibility of the laboratory to clearly cite any compounds that are out of specifications and qualify data accordingly.

For non-CCC compounds the % RSD should be less than 25%. Major deviations from the 25% rule shall result in qualification or rejection of that fraction. Major deviations shall be defined as an RSD greater than 50%

E. Surrogate Compound Recovery Summary - Use Form 0-10 or the equivalent
1. The current USEPA IFB forms with water/soil (solid waste) matrix categories as criteria of achievement stated, or

In-house determined R+3s as defined by EPA-600/4-82-057, July 1982 protocols, wherein a minimum three surrogates per fraction will be used (1 surrogate for pesticides/PCBs and 2,3,7,8-TCDD analysis).

2. Criteria of achievement for surrogates is to be rigorously followed and is directly related to an IFB preassessment (Screen) of samples. The current version of the IFB gives directions for surrogates that are outside of the control limits. NJDEP suggests use of preassessment (Screen) for samples in all organic fractions to place a specific sample into the appropriate analytical scheme. This appropriately chosen scheme will give better recoveries for surrogates and fewer problems to the laboratory in handling our diverse samples. GC or GC/MS screening in mandatory for extractable organics (acid and base/neutral compounds) for soil matrices analyzed by USEPA CLP laboratories and strongly recommended for all other laboratories. Proof of this screen need not be delivered in the final data package, but NJDEP reserves the right to inspect these data at any time.

F. Non-Targeted Analyte Summary Form

An EPA/NBS/MH library search (April 1982 version with 38,700 + analytes or the latest version) is required. The following information must be presented: Scan number, analyte, CAS number, relative retention time, molecular weight, and estimated concentration. Use forms 0-11 through 0-13, or the equivalents.

G. Documentation Required

1. Qualitative Proofs

a. Supportive confirmation spectra used for comparison for positive targeted compounds must be provided.

b. Alternately, for target analyte proofs, the laboratory shall provide Mass Ion Chromatograms for characteristic and secondary ions versus the RIC or TIC showing Maximazation within +1 scan. Presentation must be within a limited window near the expected RT of the analyte.

c. NBS/NIH/EPA library search presentation of non-targeted compound spectra with three best matches. If possible additional classification of the unknown compounds should be presented (i.e. unknown aromatic, unknown hydrocarbon, unknown acid compound, unknown chlorinated compound.)

2. Data System Output - Software used should be defined as to type and source.

   a. Previous to a GC/MS acquisition, the software will ask for sample name and miscellaneous information, termed header information. The analyst must provide sufficient information for unique identification, e.g. sample number or standard, sample size used for preparation and dilution, if applicable. If more than one instrument is used, the instrument ID number must be included. This will then appear on RIC or TIC.

   b. Actual data output of the quantitation report must be submitted for all runs.

   c. Complete quantitation report must include the following:

      . Summary (include all analytes)

      . Method of quantitation includes the calculation formula with R.F., response factor, from daily standard run, i.e. library entry, or average RF (average RF from the initialization standards).

      . Analyte list of target compounds examined including: IS, internal standards, and surrogates.

      . Tentative identification list of analytes present which passed the software algorithm. All "not founds" for those analytes not passing software algorithm must be listed. Quantitation values would appear at this time.

      . Detailed report of library (standard value) comparisons used by the software algorithm to search the sample runs must be presented. The RTs, sample and standards, and the RFs, standards for each analyte tentatively found and "not found" must be included.

   d. Initialized handwritten decision by the mass spectroscopist, indicating negation or confirmation of the software's tentatively identified compounds values is required.

3. Supportive Raw Data

a. Chromatograms (RICs or TICs) and m/z tabular listings must be included for all tune compounds.

b. Chromatograms must be included for method blanks, spiked blanks, calibration standards, field samples matrix spike and matrix spike duplicate. The chromatogram must be labeled, at a minimum, as internal standard (IS), surrogate(s), targeted analytes (T) and nontargeted analytes (NT). If labeling cannot be accomplished by laboratory software, it must be done manually.

III. REPORTING REQUIREMENTS AND DELIVERABLES PESTICIDES AND PCBS BY GC/ECD

A. Targeted Analyte Summary - Record quantitative results either the primary or confirmatory result), MDLs, method blank and spiked blank results on Form 0-1 or the equivalent. The external standard quantitation method must be used to quantitate all pesticides/PCBs. All standards shall be run at the same attenuation as the sample run. Quantitation must be based on packed column data, whereas confirmation can be on either a packed or capillary column. Quantitative results shall be on a dry weight basis for soil and sediment samples. Quantitate every identifiable peak unless interference with individual peaks persist after cleanup. Add peak height (1) or peak area (1) of each identified peak in the chromatogram. Calculate as total response in the sample versus total response in the standard.

(1) Must be consistent in use of height or of area throughout entire analysis, and calibration.

B. Matrix Spike/Matrix Spike Duplicate - Record results on Form 0-2 and/or 0-3 or the equivalent. See Section II. B. for details.

C. Surrogate Compound Recovery Summary - use Form 0-10 or the equivalent. Dibutylchlorendate (DBC) must be used to spike all standards, samples, blanks, matrix spikes and matrix spike duplicate samples. NJDEP considers the recovery of DBC for informational purposes only; sample reanalysis based on poor recovery of DBC is not required.

D. Chromatograms - Copies of chromatograms must be submitted for field samples method blanks (both primary and confirmatory), calibration standards, matrix spike and matrix spike duplicates. Chromatograms must be clearly labelled with the following:

1. Sample I.D.
2. Volume injected
3. Date and time of injection
4. GC column identification
5. GC instrument identification - exact instrument used

6. Positively identified analytes, either directly above the peak or on a printout of retention times if retention times are printed over the peak.

E. If using manual data reduction, retention times and areas must be provided. Form P-1 and P-2 must be used.

F. If performing data reduction by using software retention time windows for each analyte, documentation must be furnished. Form P-2 must be used.

IV. REPORTING REQUIREMENTS AND DELIVERABLES: METALS

This section may be required in total on a project-specific basis. Otherwise it is considered optional but is strongly encouraged by NJDEP. At a minimum for all work, the following requirements are mandatory: analytical results, method detection limits, and method blank results.

A. Flame Atomic Absorption and ICP - Achievements for analytical results and QA/QC operations shall be reported on Form M-1 or the equivalent.

1. Analytical Results - tabulated results are to be reported in ug/lor mg/kg for each analyte. If the value is greater than or equal to the method detection limit (MDL) report as found. If the value is less than the minimum detection limit, report "less than MDL" and report the value found in parentheses, e.g." MDL (2)." If the element was analyzed for but not detected, report "ND." A statement on any atypical MDLs used must be included. The MDL shall be determined by multiplying by three, the standard deviation obtained for the analysis of a standard solution at a concentration 3-5 times the current IFB contract required detection limit (CRDL) on 3 non-consecutive days with 7 consecutive measurements per day (See Table I).

2. Method Blank Analysis - at least one for each Case of samples or group of twenty, whichever is more frequent.

3. Duplicate Analysis - at least one for each Case of samples or group of twenty, whichever is more frequent. The relative percent differences (RPD) must be reported for each component:

$$RPD = \frac{D_2 - D_1}{(D_1 + D_2)/2} \times 100$$

where D_1 = first sample value and D_2 = duplicate value.

A control limit of ±20% for RPD shall be used for sample values greater than 5 times the CRDL and ±CRDL for sample values less than 5 times the CRDL. If either sample value is less than the CRDL the RPD is not calculated and is indicated as "NC." If duplicate sample results are outside of the control limits, flag all data associated with that duplicate sample with (*).

4. Initial Calibration, Continuing Calibration Verification and Associated Blanks use Form M-2 or the equivalent. The initial calibration curve consists of a reagent blank and three standards are prepared. The curve is then cerified for each analyte at a frequency of 10% or every 2 hours, whichever is more frequent, and at the end of the run. The curve shall be verified and documented for each analyte by the analysis of EPA Quality Control Solutions (available from USEPA, Telephone 513-684-7325) or an independent standard at a concentration other than that used for calibration, but within the calibration range. If measurements are outside of the accepted control limits shown in Table II, the analysis must be terminated, the problem corrected, the instrument recalibrated, and the calibration re-verified.

5. Matrix Spike - at least one for each Case of samples or group of twenty, whichever is more frequent. Refer to Table III for suggested amounts of analyte spike to be added prior to digestion. If the spike recovery is not within the control limits of 75 - 125%, the data of all associated samples must be flagged with (*). An exception to this requirement is granted in situations where the sample concentration exceeds the spike concentration by a factor of four or more. In such a case, the spike recovery will not be considered and the data shall be reported unflagged, even if the percent recovery does not meet the 75-125% recovery criteria. Calculate the individual analyte percent recoveries as follows:

$$\% \text{ Recovery} = \frac{(SSR - SR)}{SA} \times 100$$

where SSR = Spiked Sample Results
SR = Sample Result
SA = Spike Added

When sample concentration is less than the contract required detection limit, use SR=0 for the purposes of calculating percent recoveries. The matrix spike may be run in duplicate to satisfy #3 above.

6. ICP Interference Check Sample Analysis - Record results on Form M-3 or the equivalent. To verify inter-element and background correction factors the Contractor shall analyze an interference check sample (such as the one sometimes available from EMSL-Cin) at the beginning and end of each sample analysis run (or a minimum of twice per 8 hour working shift, whichever is most frequent). The check sample must be analyzed initially at least 5 times repetitively to establish a mean value and standard deviation. Results during the analytical runs should fall within the established control limits of ±20% of the mean value and standard deviation. If not, terminate the analysis, correct the problem, recalibrate, reverify the calibration, and reanalyze the samples. Interferent and analyte elemental concentrations used

for interference measurements must be at levels stated in Table III for ICP with the exception of Ca, Mg, Al, Fe, each of which must be present at total concentrations of 500,000 ug/l.

B. Furnance Atomic Absorption Analysis

For every sample analyzed, verification is necessary to determine whether or not the Method of Standard Additions (MSA) is required. In all cases, initial single spike data and percent recovery shall be reported on Form M-4 or the equivalent. If MSA is required, the following information must be presented on Form M-4:

1. The absorbence and concentrations for zero, first, second and third additions.

2. Sample concentration determined from the x-intercept.

3. The following procedures will be incorporated into MSA analyses.

   a) Data form MSA calculations must be within the linear range as determined by the calibration curve generated at the beginning of the analytical run.

   b) The sample and three spikes must be analyzed consecutively for MSA quantitation (the "initial" spike run data is specifically excluded from use in the MSA quantitation). Only single injections are required for MSA quantitation.

   c) Spikes should be prepared such that:

      . Spike 1 is approximately 50% of the sample absorbance.
      . Spike 2 is approximately 100% of the sample absorbance.
      . Spile 3 is approximately 150% of the sample absorbance.

      Spikes are to be prepared prior to analysis by adding a known quantity of the analyte to an aliquot of the digested sample. The unspiked sample aliquot must be compensated for any volume change in the spike samples by addition of deionized water to the unspiked sample aliquot.

   d) The data for MSA quantitation should be clearly identified in the raw data documentation along with the slope, intercept and correlation coefficient (r) for the least squares fit of the data and the results reported on Form M-4. Reported values obtained by MSA are flagged on the data sheet with the letter "s".

   e) If the correlation coefficient (r) for a particular analysis is less than 0.99 the MSA analyses must be repeated once. If the correlation coefficient is still 0.99, the results on Form I must be flagged with "+".

V. REPORTING REQUIREMENTS AND DELIVERABLES FOR 2,3,7,8 - TCDD (DIOXIN)

A. Quantitative Results and Quality Control Data Record results on Form D-1 or the equivalent. Units of ppb may be used for reporting Dioxin data. This information shall include:

1. The sample identification number
2. The calculated value for native 2,3,7,8 - TCDD. (Values below 1.0 PPB are also reported.)
3. If no 2,3,7,8 - TCDD was detected, report "not detected" or N.D. and give the calculated detection limit. (Detection limits below 1.0 PPB are also reported.)
4. The raw peak responses for ions 320, 322, 257, and 328 or 332 and 334.
5. The response ratio of 320/322 and 332/334.
6. Analytical date and time.
7. The percent accuracy for the surrogate standard. The action limits for surrogate standard results will be ±40% of the true value. Sample showing surrogate recoveries outside of these limits must be reextracted and reanalyzed, duplicates must have a percent difference of less than 50%.
8. The results of duplicate analyses. At least one duplicate must be run per each set of 24 samples.
9. The percent recovery of native TCDD from spiked samples. At least one spike must be run for each set of 24 samples.
10. The results from the method blanks. At least one method blank must be run for each set of 24 samples.
11. The weight of the original wet sample aliquot (for soils/solid waste samples).
12. The mass chromatograms for all samples and standards must be submitted.

B. Qualitative Requirements - The following criteria must be met and documentation must be provided:

1. Isomer specificity - must be demonstrated initially and verified once per 12 hour work shift by analyzing a column performance check solution containing a mixture of 7 TCDD isomers. The 2,3,7,8 - TCDD must be separated from interferring isomers with a valley relative to the 2,3,7,8 - TCDD peak of 25%. The mass chromatograms for this daily column performance check must be submitted.

2. The ratio of m/z 320/322 must be within the range 0.67 x 0.87.

3. The ions 320, 322, and 257 must all be present and maximize together. The signal to mean noise ratio must be 2.5 for all three ions.

4. The retention time of 2,3,7,8 - TCDD must be within 3 seconds of isotopically labelled 2,3,7,8 - TCDD.

5. SIM data acquisition requirements shall be:

   a. Cycle time 1.5 seconds
   b. Acquisition of minimum of 5 spectra during elution of 2,3,7,8 - TCDD.

6. DFTPP tuning criteria for partial scan analysis is shown in Table 1; this must be satisfied.

7. A confirmatory partial scan must be performed on one sample per batch, with SIM data indicated the highest level of 2,3,7,8 - TCDD. If no samples within the batch had detectable quantities of 2,3,7,8 - TCDD, the partial scan is not required. When performed, the partial scan spectra must be performed from mass 150 to 350. The following guidelines must be followed:

   a. The 320/324 ration should be 1.58 ±0.16
   b. The 257/259 ratio should be 1.03 ±.10
   c. The 194/196 ratio should be 1.54 ±.15
   d. The ions with masses of 160, 161, 194, 196, 257, 259, 320, 322, and 324 should all be present with at least 5% relative abundance (relative to 322). Partial scan confirmation data shall be reported on Form D-2 or the equivalent. A reconstructed ion chromatogram for any partial scan confirmation must be included. Provide the background mass spectrum and the TCDD spectrum before and after background subtraction.

C. Calibration Summary

1. Initial Calibration - GC/MS calibration standards (suggested concentrations equivalent to 1, 5 and 25 ppb must be analyzed Solutions at 100 and 200 ppb may be required. The relative response factors (RRF) over the working range must be demonstrated to have a relative standard deviation (RSD) 10%. The surrogate standard RRF must also be determined from the same set of three calibration standards. Record results on Form D-3 or the equivalent.

2. Continuing Calibration and Surrogate Summary - The RRF must be verified on each 12 hour work shift or less, by the measurements of one or more calibration standards, one of which must be a 1.0 ppb standard. If the response for 2,3,7,8 - TCDD varies from the predicted response by more than ±10%, the test must be repeated using a fresh calibration standard or a new calibration curve must be obtained. The surrogate RRF must be validated in the same manner, and if the current RRF is out of specification, remediation shall be handled similarly. Record results on Form D-4 or the equivalent.

D. Quality Control Requirements - General

1. The laboratory may be given performance evaluation samples for soils by NJDEP on a periodic basis throughout the course of a given project. Additional sample analyses will not be permitted if the performance criteria are not achieved. Corrective action must be taken and demonstrated before sample analyses can resume.

2. Samples may be split with other participating labs on a periodic basis to ensure interlaboratory consistency.

3. Field duplicates (individual samples taken from the same location at the same time) will be submitted periodically to determine the total precision (field and lab).

E. Sample Reruns

Sample analyses must be repeated if any of the following conditions apply:

1. A detection limit of 1.0 PPB could not be achieved. Subject the extract to additional cleanup. Use Option D (charcoal cleanup).*

2. The percent accuracy for surrogate standard was outside of acceptance limits. Reextract and reanalyze sample aliquot. Use Option B followed by D.*

3. The calculated TCDD amount was outside the upper calibration range. Extend the calibration range by running an appropriate standard or reextract using a 1.0 gram sample aliquot.

4. The method blank contained TCDD. Reanalyze the entire batch of samples.

5. The internal standard 332/334 ratio was outside the 0.67-0.87 control limits. Subject the extract to additional cleanup. Use Option D.*

6. The internal standard was not present with at least 10/1 signal to noise ratio at mass 332 and 334. Reextract and reanalyze sample aliquot. Use Option A or B followed by D.*

* "Clean-up options should be chosen to achieve proper detection limits, surrogate recoveries, etc., and should be based on the Options as described in the most current version of the IFB."

TABLE I. ELEMENTS DETERMINED BY INDUCTIVELY COUPLED PLASMA EMISSION OR ATOMIC ABSORPTION SPECTROSCOPY

Element	Drinking Water Criteria (ug/L)	Contract Required Detection Level (ug/L)
Aluminum	—	200
Antimony	— (P)	20
Arsenic	50 (P) (Pr)	10
Barium	1000 (Pr)	200
Beryllium	— (P)	5
Cadmium	10 (P) (Pr)	2
Calcium	—	1000
Chromium	50 (P) (Pr)	10
Cobalt	—	50
Copper	1000 (S) (P)	25
Iron	300 (S)	100
Lead	50 (P) (Pr)	5
Magnesium	—	1000
Manganese	50 (S)	15
Mercury	2 (P) (Pr)	0.2
Nickel	— (P)	40
Potassium	—	1000
Selenium	10 (P) (Pr)	5
Silver	50 (P) (Pr)	10
Sodium	—	1000
Thallium	— (P)	10
Tin	—	40
Vanadium	— (H)	200
Zinc	5000 (S) (P)	20

(S) Secondary water standard
(P) Priority pollutant
(H) Hazardous constituent
(Pr) Primary water standard

REFERENCE: USEPA Contract Laboratory Program Statement of Work, Inorganic Analysis Multi-Media, Multi-Concentration, May, 1984.

TABLE II. INITIAL AND CONTINUING CALIBRATION VERIFICATION CONTROL LIMITS FOR INORGANIC ANALYSES

Analytical Method	Inorganic Species	% of True Value Low Limit	(EPA Sec) High Limit
ICP Spectroscopy/ Flame Atomic Absorption Spectrometry	Applicable Metals	90	110
Furnace AA	Applicable Metals	90	110
	Tin	80	120
Cold Vapor AA	Mercury	80	120
Other	Cyanide	90	110

REFERENCE: Use EPA Contract Laboratory Program Statement of Work, Inorganic Analysis, Multi-Media, Multi-Concentration, May, 1984.

TABLE III. SPIKED SAMPLES

AMOUNT TO ADD PRIOR TO DIGESTION/DISTILLATION—
CHOOSE AMOUNT APPROPRIATE TO METHOD OF ANALYSIS

Element	for ICP/AA (ug/L)		for Furnace AA (ug/L)		Other (ug/L)
	Water	Sediment*	Water	Sediment*	
Aluminum	2,000				
Antimony			50	100	
Arsenic			20	100	
Barium	2,000	10,000			
Beryllium	50	100			
Cadmium	50	500	10		
Calcium	100,000				
Chromium	200	2,000			
Cobalt	500	2,000			
Copper	250	2,000			
Iron	1,000				
Lead	500	5,000	20		
Magnesium	50,000				
Manganese	200	5,000			
Mercury					
Nickel	400	5,000			
Potassium	50,000				
Selenium			10	100	
Silver	200	200			
Sodium	100,000				
Thallium			50	100	
Tin	400		200		
Vanadium	200	1,000			
Zinc	200	5,000			

*Concentration of added analyte in the digest of spiked sample (spike is acced before digestion).

REFERENCE: USEPA Contract Laboratory Program Statement of Work Inorganic Analysis, Multi-Media, Multi-Concentration, May, 1984.

TIER I DATA REPORTING DELIVERABLES FORMAT

(TITLE PAGE)

Analytical Data Report Package

for

New Jersey Department of Environmental Protection

Hazardous Site Mitigation Administration

CN-029

Trenton, N. J. 08625

Case Name	Field Sample #	Laboratory Sample #	Sample Location	Date and Time of Sample Collection

Lab Name _____

Certification # _____

Supervisor/Manager Signature _____

Name _____

Form DWM C-1

Revised 10/85

Form DWM-025
6-84

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

SAMPLE ANALYSIS REQUEST FORM

NJDEP File #

SAMPLE LOCATION

NAME OF FACILITY/ COMPANY/PERSON	CODE	MAILING ADDRESS
SITE LOCATION		

SAMPLE COLLECTOR

SAMPLER(S) Name	Agency	Sampler ID #
Name	Agency	Sampler ID #

SAMPLE IDENTIFICATION

NJDEP SAMPLE NO.	SAMPLING DATE	ABSCISSA (Longitude)
SAMPLE POINT ID	TIME (MIL) SAMPLING BEGAN	ORDINATE (Latitude)
SAMPLE SOURCE CODE	TIME (MIL) SAMPLING FINISHED	ELEVATION
REFERENCE POINT		

SAMPLING PROCESS

COLLECTION METHOD	Code	Other	SAMPLE TYPE	Code	Other
TYPE OF SAMPLER	Code	Other	SAMPLE MATRIX	Code	Other
DESCRIPTION					

FIELD MEASUREMENTS

SAMPLE TEMP. °C	PARAMETER	PARAMETER	PARAMETER
AIR TEMP. °C	VALUE	VALUE	VALUE
WEATHER			

CHAIN-OF-CUSTODY IMPLEMENTED ☐ YES ☐ NO | PRESERVATION CODE(S) ___ ___ ___ ___ ___

REQUESTED ANALYSIS(ES)

PARAMETERS (by Compound or Group of Compounds)	CONTAINER NUMBER	DETECTION LIMIT (digits/units)	PRECISION & ACCURACY LIMITS	REQUESTED TURNOVER (days)

ANALYSIS(ES) AUTHORIZED BY | TITLE

Form DWM G-2 Revised 10/85

ANALYZING LABORATORY

CONTRACT LAB NAME | PERSON ACCEPTING SAMPLE | TITLE

Form DMM-0038
6/84

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

CHAIN OF CUSTODY RECORD

Use One Form for Each Sample — *Shaded Areas for DEP Field Use Only*

NAME OF UNIT AND ADDRESS

Name of Person(s) Preparing Container(s) for Sample Shuttle

Name | Title | Agency

Name | Title | Agency

Date above-mentioned Person(s) Placed Container(s) in Sample Shuttle | Military Time | Laboratory Affixed Sample Shuttle Seal No.

Name of Person(s) Breaking Laboratory Seal on Sample Shuttle and Taking Field Sample

Name _____ Title _____

Name _____ Title _____

Name Title

Date Laboratory Sample Shuttle Seal No. Broken | Time (Mil) Seal Broken and Sampling Begun

FIELD SAMPLE NUMBER	CONTAINER NUMBER(S)	VOLUME OF CONTAINERS	DESCRIPTION OF SAMPLE
LAB CONTROL NO. _____			

Date Sampling Completed & Field Seal Affixed to Sample Shuttle | Military Time | Field Affixed Sample Shuttle Seal No

Laboratory Person Breaking Field Seal on Sample Shuttle & Accepting Responsibility for Sample

Name Title

Field Sample Seal No. | Date Broken | Military Time Seal Broken

SAMPLE RELINQUISHED BY	SAMPLE RECEIVED BY	DATE	TIME	REASON FOR CHANGE OF CUSTODY

Form DMM C-3 Revised 10/85

Form [illegible]
1/86

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
TRENTON, NEW JERSEY 08625

CHAIN OF CUSTODY RECORD

NAME OF UNIT AND ADDRESS:

SAMPLE NUMBER	Number of Containers	DESCRIPTION OF SAMPLES

PERSON ASSUMING RESPONSIBILITY FOR SAMPLE:	TIME	DA[TE]

SAMPLE NUMBER	RELINQUISHED BY:	RECEIVED BY:	TIME	DATE	REASON FOR CHANGE OF CUSTODY

Form [illegible] Revised 10/85

LABORATORY CHRONICLE

DATE

RECEIPT/REFRIGERATION_____

ORGANICS
EXTRACTION

1. Acids_____
2. Base/Neutrals_____
3. Pesticides/PCBs_____
4. Dioxin_____

ANALYSIS

1. Volatiles_____
2. Acids_____
3. Base/Neutrals_____
4. Pesticides/PCBs_____
5. Dioxin_____

Section Supevisor_____
Review & Approval

INORGANICS

1. Metals_____
2. Cyanides_____
3. Phenol_____

OTHER ANALYTES

_____
_____
_____

Section Supervisor_____
Review & Approval

Quality Control Supervisor_____
Review & Approval

If fractions are re-extracted and re-analyzed because initial endeavors did not meet quality control acceptance criteria, include dates for both.

FORM DWM-G5
REVISED 10/85

METHODOLOGY SUMMARY
(Include only fractions actually analysed)

Purgeable Organics

Acid Extractables

Base/Neutral Extractables

Metals

Total Cyanide

Total Phenol

Other

QUANTITATIVE RESULTS

ORGANIC FRACTION:_____
LABORATORY SAMPLE NO:_____
SAMPLE LOCATION/FACILITY:_____

Parameter	Results Sample Concentration Units:	Method Blank Units:

WATER MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Case No. _____ Contractor _____ Contract No. _____

FRACTION	COMPOUND	CONC. SPIKE ADDED (ug/L)	SAMPLE RESULT	CONC. MS	% REC	CONC. MSD	% REC	RPD	QC LIMITS* RPD	QC LIMITS* RECOVERY
VOA SMO SAMPLE NO.	1,1 Dichloroethene								14	61-145
	Trichloroethene								14	71-120
	Chlorobenzene								13	75-130
	Toluene								13	76-125
_____	Benzene								11	76-127
B/N SMO SAMPLE NO.	1,2,4 Trichlorobenzene								28	39-98
	Acenaphthene								31	46-118
	2,4 Dinitrotoluene								28	24-96
	Di-n Butylphthalate								40	11-117
	Pyrene								31	26-127
	N Nitroso Di-n Propylamine								38	41-116
_____	1,4 Dichlorobenzene								28	36-97
ACID SMO SAMPLE NO.	Pentachlorophenol								50	9-103
	Phenol								42	12-89
	2-Chlorophenol								40	27-123
	4-Chloro-3-Methylphenol								42	23-97
_____	4-Nitrophenol								50	10-80
PEST SMO SAMPLE NO.	Lindane								15	56-123
	Heptachlor								20	40-131
	Aldrin								22	40-120
	Dieldrin								18	52-126
	Endrin								21	56-121
_____	4,4'-DDT								27	38-127

*ASTERISKED VALUES ARE OUTSIDE QC LIMITS.

RPD: VOAs ____ out of ____ ; outside QC limits
B/N ____ out of ____ ; outside QC limits
ACID ____ out of ____ ; outside QC limits
PEST ____ out of ____ ; outside QC limits

RECOVERY: VOAs ____ out of ____ ; outside QC limits
B/N ____ out of ____ ; outside QC limits
ACID ____ out of ____ ; outside QC limits
PEST ____ out of ____ ; outside QC limits

Comments: _____

Form DWM O-2
Revised 10/85

SOIL MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Case No. _____ Contractor _____ Contract No. _____

Low Level _____ Medium Level _____

FRACTION	COMPOUND	CONC. SPIKE ADDED (ug/Kg)	SAMPLE RESULT	CONC. MS	% REC	CONC. MSD	% REC	RPD	QC LIMITS * RPD	QC LIMITS * RECOVERY
VOA SMO SAMPLE NO.	1,1 Dichloroethene								22	59-172
	Trichloroethene								24	62-137
	Chlorobenzene								21	60-133
	Toluene								21	59-139
_____	Benzene								21	66-142
B/N SMO SAMPLE NO.	1,2,4 Trichlorobenzene								23	38-107
	Acenaphthene								19	31-137
	2,4 Dinitrotoluene								47	28-89
	Di-n Butylphthalate								47	29-135
	Pyrene								36	35-142
	N Nitrosodi-n-Propylamine								38	41-126
_____	1,4 Dichlorobenzene								27	28-104
ACID SMO SAMPLE NO.	Pentachlorophenol								47	17-109
	Phenol								35	26-90
	2 Chlorophenol								50	25-102
	4 Chloro-3 Methylphenol								33	26-103
_____	4 Nitrophenol								50	11-114
PEST SMO SAMPLE NO.	Lindane								50	46-127
	Heptachlor								31	35-130
	Aldrin								43	34-132
	Dieldrin								38	31-134
	Endrin								45	42-139
_____	4,4'-DDT								50	23-134

*ASTERISKED VALUES ARE OUTSIDE QC LIMITS.

RPD: VOAs ____ out of ____ ; outside QC limits
B/N ____ out of ____ ; outside QC limits
ACID ____ out of ____ ; outside QC limits
PEST ____ out of ____ ; outside QC limits

RECOVERY: VOAs ____ out of ____ ; outside QC limits
B/N ____ out of ____ ; outside QC limits
ACID ____ out of ____ ; outside QC limits
PEST ____ out of ____ ; outside QC limits

Comments: _____

Form DWM O-3
Revised 10/85

GC/MS STANDARD P-BROMOFLUOROBENZENE (BFB) TUNE
CRITERIA FOR VOLATILES, 20ng LEVEL OR LESS

DATE_____ TIME_____

INSTRUMENT ID_____ ANALYST_____

LAB SAMPLE NO. WHICH WILL BE
AFFECTED BY THIS PERFORMANCE_____

DATA RELEASE AUTHORIZED BY_____

m/e	Ion Abundance Criteria	% Relative Abundance
50	15 - 40% of the base peak	
75	30 - 60% of the base peak	
95	Base peak, 100% relative abundance	
96	5 - 9% of the base peak	
173	Less than 1% of the base peak	
174	Greater than 50% of the base peak	
175	5 - 9% of mass 174	( )[1]
176	Greater than 95%, but less than 101% of 174	( )[1]
177	5 - 9% of mass 176	( )[2]

[1]Value in parenthesis is % of mass 174.
[2]Value in parenthesis is % of mass 176.

GC/MS STANDARD DECAFLUOROTRIPHENYLPHOSPHINE(DFTPP) TUNE
CRITERIA FOR SEMIVOLATILES, 20ng LEVEL OR LESS

DATE_____ TIME_____

INSTRUMENT ID_____ ANALYST_____

LAB SAMPLE NO. WHICH WILL BE
AFFECTED BY THIS PERFORMANCE_____

DATA RELEASE AUTHORIZED BY_____

m/e	Ion Abundance Criteria	% Relative Abundance
51	30.0 - 60.0% of mass 198	
68	less than 2.0% of mass 69	( )[1]
69	mass 69 relative abundance	
70	less than 2.0% of mass 69	( )[1]
127	40.0 - 60.0% of mass 198	
197	less than 1.0% of mass 198	
198	base peak, 100% relative abundance	
199	5.0 - 9.0% of mass 198	
275	10.0 - 30.0% of mass 198	
365	greater than 1.00% of mass 198	
441	present, but less than mass 443	
442	greater than 40.0% of mass 198	
443	17.0 - 23.0% of mass 442	

[1]Value in parenthesis is % mass 69.
[2]Value in parenthesis is % mass 442.

Initial Calibration Data
Volatile HSL Compounds

Case No: _____ Region _____ Instrument I D: _____

Contractor: _____ Calibration Date: _____

Contract No: _____

Minimum $\overline{RF}$ for SPCC is 0.300 (0.25 for Bromoform) Maximum % RSD for CCC is 30%

Laboratory ID								
Compound	RF_{20}	RF_{50}	RF_{100}	RF_{150}	RF_{200}	$\overline{RF}$	% RSD	CCC* SPCC**
Chloromethane								**
Bromomethane								
Vinyl Chloride								*
Chloroethane								
Methylene Chloride								
Acetone								
Carbon Disulfide								
1, 1-Dichloroethene								*
1, 1-Dichloroethane								**
Trans-1, 2-Dichloroethene								
Chloroform								*
1, 2-Dichloroethane								
2-Butanone								
1, 1, 1-Trichloroethane								
Carbon Tetrachloride								
Vinyl Acetate								
Bromodichloromethane								
1, 2-Dichloropropane								*
Trans-1, 3-Dichloropropene								
Trichloroethene								
Dibromochloromethane								
1, 1, 2-Trichloroethane								
Benzene								
cis-1, 3-Dichloropropene								
2-Chloroethylvinylether								
Bromoform								**
4-Methyl-2-Pentanone								
2-Hexanone								
Tetrachloroethene								
1, 1, 2, 2-Tetrachloroethane								**
Toluene								*
Chlorobenzene								**
Ethylbenzene								*
Styrene								
Total Xylenes								

RF -Response Factor (subscript is the amount of ug/L)
$\overline{RF}$ -Average Response Factor
%RSD -Percent Relative Standard Deviation

CCC -Calibration Check Compounds (*)
SPCC -System Performance Check Compounds (**)

Initial Calibration Data
Semivolatile HSL Compounds
(Page 1)

Case No: _____ Instrument ID: _____

Contractor: _____ Calibration Date: _____

Contract No. _____

Minimum $\overline{RF}$ for SPCC is 0.050 Maximum % RSD for CCC is 30%

Laboratory ID								
Compound	RF_{20}	RF_{50}	RF_{80}	RF_{120}	RF_{160}	$\overline{RF}$	% RSD	CCC* SPCC**
N-Nitrosodimethylamine								
Phenol								*
Aniline								
bis-2-ChloroethylEther								
2-Chlorophenol								
1,3-Dichlorobenzene								
1,4-Dichlorobenzene								*
Benzyl Alcohol								
1,2-Dichlorobenzene								
2-Methylphenol								
bis2-chloroisopropylEther								
4-Methylphenol								
N-Nitroso-Di-n-Propylamine								* *
Hexachloroethane								
Nitrobenzene								
Isophorone								
2-Nitrophenol								*
2,4-Dimethylphenol								
Benzoic Acid	†							
bis-2-Chloroethoxymethane								
2,4-Dichlorophenol								
1,2,4-Trichlorobenzene								
Naphthalene								
4-Chloroaniline								
Hexachlorobutadiene								*
4-Chloro-3-Methylphenol								*
2-Methylnaphthalene								
Hexachlorocyclopentadiene								* *
2,4,6-Trichlorophenol								*
2,4,5-Trichlorophenol	†							
2-Chloronaphthalene								
2-Nitroaniline	†							
Dimethyl Phthalate								
Acenaphthylene								
3-Nitroaniline	†							
Acenaphthene								*
2,4-Dinitrophenol	†							* *
4-Nitrophenol	†.							* *
Dibenzofuran								

Response Factor (subscript is the amount of nanograms)
$\overline{RF}$ -Average Response Factor
%RSD -Percent Relative Standard Deviation
CCC -Calibration Check Compounds (*)

SPCC -System Performance Check Compounds (**)
† -Not detectable at 20 ng for benzoic acid
not detectable at < 80 ng

Form DWM 0-7
Revised 10/85

Initial Calibration Data
Semivolatile HSL Compounds
(Page 2)

Case No. _____ Region: _____ Instrument ID _____

Contractor: _____ Calibration Date: _____

Contract No: _____

Minimum $\overline{RF}$ for SPCC is 0.050 Maximum % RSD for CCC is 30%

Laboratory ID								
Compound	RF_{20}	RF_{50}	RF_{80}	RF_{120}	RF_{160}	$\overline{RF}$	% RSD	CCC* SPCC**
2,4-Dinitrotoluene								
2,6-Dinitrotoluene								
Diethylphthalate								
4-Chlorophenyl-phenylether								
Fluorene								
4-Nitroaniline	†							
4,6-Dinitro-2-Methylphenol	†							
N-Nitrosodiphenylamine (1)								•
4-Bromophenyl-phenylether								
Hexachlorobenzene								
Pentachlorophenol	†							•
Phenanthrene								
Anthracene								
Di-N-Butylphthalate								
Fluoranthene								•
Pyrene								
Butylbenzylphthalate								
3,3'-Dichlorobenzidine								
Benzo(a)Anthracene								
bis(2-Ethylhexyl)Phthalate								
Chrysene								
Di-n-Octyl Phthalate								•
Benzo(b)Fluoranthene								
Benzo(k)Fluoranthene								
Benzo(a)Pyrene								•
Indeno(1,2,3-cd)Pyrene								
Dibenz(a,h)Anthracene								
Benzo(g,h,i)Perylene								

Response Factor (subscript is the amount of nanograms)
$\overline{RF}$ -Average Response Factor
%RSD -Percent Relative Standard Deviation
CCC -Calibration Check Compounds (•)
SPCC -System Performance Check Compounds (••)
† - Not detectable at 20 ng
(1) -Cannot be separated from diphenylamine

Form DWM O-7 (con't)

Continuing Calibration Check
Volatile HSL Compounds

Case No: _____ **Calibration Date:** _____

Contractor: _____ **Time:** _____

Contract No: _____ **Laboratory ID:** _____

Instrument ID: _____ **Initial Calibration Date:** _____

Minimum RF for SPCC is 0.300 **Maximum %D for CCC is 25%**

Compound	RF	RF_{50}	%D	CCC	SPCC
Chloromethane					• •
Bromomethane					
Vinyl Chloride				•	
Chloroethane					
Methylene Chloride					
Acetone					
Carbon Disulfide					
1, 1-Dichloroethene				•	
1, 1-Dichloroethane					• •
Trans-1, 2-Dichloroethene					
Chloroform				•	
1, 2-Dichloroethane					
2-Butanone					
1, 1, 1-Trichloroethane					
Carbon Tetrachloride					
Vinyl Acetate					
Bromodichloromethane					
1, 2-Dichloropropane				•	
Trans-1, 3-Dichloropropene					
Trichloroethene					
Dibromochloromethane					
1, 1, 2-Trichloroethane					
Benzene					
cis-1, 3-Dichloropropene					
2-Chloroethylvinylether					
Bromoform					• •
2-Hexanone					
4-Methyl-2-Pentanone					
Tetrachloroethene					
1, 1, 2, 2-Tetrachloroethane					• •
Toluene				•	
Chlorobenzene					• •
Ethylbenzene				•	
Styrene					
Total Xylenes					

RF_{50} -Response Factor from daily standard run at 50 ug/l
RF -Average Response Factor from initial calibration Form VI

%D -Percent Difference
CCC -Calibration Check Compounds (•)
SPCC -System Performance Check Compounds (• •)

Continuing Calibration Check
Semivolatile HSL Compounds
(Page 1)

Case No: _____ Region: _____ Calibration Date: _____

Contractor: _____ Time: _____

Contract No: _____ Laboratory ID: _____

Instrument ID: _____ Initial Calibration Date: _____

Minimum RF for SPCC is 0.050 Maximum %D for CCC is 25%

Compound	RF	RF_{50}	%D	CCC	SPCC
Phenol				*	
bis(2 Chloroethyl)Ether					
2 Chlorophenol					
1 3-Dichlorobenzene					
1 4-Dichlorobenzene				*	
Benzyl Alcohol					
1 2 Dichlorobenzene					
2 Methylphenol					
bis(2 chloroisopropyl)Ether					
4-Methylphenol					
N-Nitroso-Di-n-Propylamine					* *
Hexachloroethane					
Nitrobenzene					
Isophorone					
2 Nitrophenol				*	
2 4 Dimethylphenol					
Benzoic Acid †					
bis(2 Chloroethoxy)Methane					
2 4-Dichlorophenol				*	
1 2 4-Trichlorobenzene					
Naphthalene					
4-Chloroaniline					
Hexachlorobutadiene				*	
4-Chloro 3 Methylphenol				*	
2 Methylnaphthalene					
Hexachlorocyclopentadiene					* *
2 4 6 Trichlorophenol				*	
2 4 5 Trichlorophenol †					
2 Chloronaphthalene					
2 Nitroaniline †					
Dimethyl Phthalate					
Acenaphthylene					
3 Nitroaniline †					
Acenaphthene				*	
2 4 Dinitrophenol †					* *
4 Nitrophenol †					* *
Dibenzofuran					

$^{1}RF_{50}$ Response factor from daily standard [illegible] concentration indicated (50 total nanograms)

RF Average Response Factor from initial calibration Form VI

†-Due to low response analyze at 60 total nanograms

%D Percent Difference

CCC Calibration Check Compounds

SPCC System Performance Check Compounds

Form DWM 0-9
Revised 10/85

Continuing Calibration Check
Semivolatile HSL Compounds
(Page 2)

Case No: _____ Calibration Date _____

Contractor: _____ Time: _____

Contract No: _____ Laboratory ID: _____

Instrument ID: _____ Initial Calibration Date _____

Minimum RF for SPCC is 0.050 Maximum %D for CCC is 25%

Compound	RF	RF_{50}	%D	CCC	SPCC
2,4-Dinitrotoluene					
2,6-Dinitrotoluene					
Diethylphthalate					
4-Chlorophenyl-phenylether					
Fluorene					
4-Nitroaniline †					
4,6-Dinitro-2-Methylphenol †					
N-Nitrosodiphenylamine (1)				•	
4-Bromophenyl-phenylether					
Hexachlorobenzene					
Pentachlorophenol †				•	
Phenanthrene					
Anthracene					
Di-N-Butylphthalate					
Fluoranthene				•	
Benzidine †					
Pyrene					
Butylbenzylphthalate					
3,3'-Dichlorobenzidine					
Benzo(a)Anthracene					
bis(2-Ethylhexyl)Phthalate					
Chrysene					
Di-n-Octyl Phthalate				•	
Benzo(b)Fluoranthene					
Benzo(k)Fluoranthene					
Benzo(a)Pyrene				•	
Indeno(1,2,3-cd)Pyrene					
Dibenz(a,h)Anthracene					
Benzo(g,h,i)Perylene					

RF_{50} - Response Factor from daily standard run at concentration indicated (50 total nanograms)

RF - Average Response Factor from initial calibration Form VI

%D - Percent Difference

† - Due to low response analyze at 80 total nanograms

CCC - Calibration Check Compounds...

SPCC - System Performance Check Compounds...

(1) - Cannot be separated from diphenylamine

GC/MS Surrogate Recovery Data

Sample No. _____ Lab Control Number _____ Sample Matrix _____

COMPOUND	CONCENTRATION ADDED TO SAMPLE MATRIX ____ units	% RECOVERY	CONTROL LIMITS (R ± 3s) (Laboratory generated)		QUALIFIED 1
			LOWER	UPPER	
Volatile Fraction (2 required) 1)					
2)					
Acid Fraction (2 required) 1)					
2)					
Base/Neutral Fraction (2 required) 1)					
2)					
Organochlorine Pesticide/PCB Fraction (1 required) 1)					
2, 3, 7, 8 - TCDD 1) $^{37}Cl_4$ Isotope 2, 3, 7, 8 - TCDD m.w. 328 (Required)					

Form DWM 0-10
Revised 10/85

SUMMARY OF NBS (38,700+ analyte version, April '82)

LIBRARY SEARCH RESULTS OF NONTARGETED PEAKS WITH

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ANALYTICAL FRACTION: PURGEABLE ORGANICS

DATA FILE NAME: SAMPLE #

EM	SCAN NUMBER	CAS #	RRT[3]	COMPOUND NAME/m.w.	MATCH FACTOR (PURITY)	ASSESSMENT[1] RS	ISO	UK	ESTIMATED CONC. (ug
1									
2									
3									
4									
5									
6									

SPECTROSCOPIST _____

DATE _____

RS - Reasonable Identification*
ISO - Isomer or Similar Compound
UK - Unknown, not in NBS Library

Calculated versus nearest eluting internal standard as a simple ratio/proportion
RRT vs 2,2'- difluorobiphenyl or d_{10}- phenanthrene, only, for semivolatiles
vs. 1,4- dichlorobutane, only for volatiles.

This shall mean the assessment of the library search by an experienced mass spectral interpretation specialist which would by his/her concurrence be a good identification using WA85-J664, J680, Task V on page A-3 and Task III on page 2-3.

SUMMARY OF NBS (38,700+ analyte version, April '82)

LIBRARY SEARCH RESULTS OF NONTARGETED PEAKS WITH

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ANALYTICAL FRACTION: ACID EXTRACTABLES

DATA FILE NAME: SAMPLE #

ITEM	SCAN NUMBER	CAS #	RRT[3]	COMPOUND NAME/m.w.	MATCH FACTOR (PURITY)	ASSESSMENT[1]			ESTIMATE CONC. (u
						RS	ISO	UK	
1									
2									
3									
4									
5									
6									
7									
8									
9									
0									

SPECTROSCOPIST _____

DATE _____

RS - Reasonable Identification*
ISO - Isomer or Similar Compound
UK - Unknown, not in NBS Library
Calculated versus nearest eluting internal standard as a simple ratio/proportion
RRT vs 2,2'- difluorobiphenyl or d_{10}- phenanthrene, only, for semivolatiles
vs. 1,4- dichlorobutane only for volatiles.

* This shall mean the assessment of the library search by an experienced mass spectral interpretation specialist which would by his/her concurrence be a good identification using WA85-J664, J680, Task V on page A-3 and Task III on page 2-3.

SUMMARY OF NBS (38,700+ analyte version, April '82)

LIBRARY SEARCH RESULTS OF NONTARGETED PEAKS WITH

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ANALYTICAL FRACTION: BASE/NEUTRAL

DATA FILE NAME: SAMPLE #

ITEM	SCAN NUMBER	CAS #	RRT[3]	COMPOUND NAME/m.w.	MATCH FACTOR (PURITY)	ASSESSMENT[1] RS	ISO	UK	ESTIMAT CONC. (
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
5									

SPECTROSCOPIST _____

DATE _____

1) RS - Reasonable Identification*
ISO - Isomer or Similar Compound
UK - Unknown, not in NBS Library

2) Calculated versus nearest eluting internal standard as a simple ratio/proportion

3) RRT vs 2,2 - difluorobiphenyl or d_{10}- phenanthrene, only, for semivolatiles
vs. 1,4- dichlorobutane, only for volatiles.

* This shall mean the assessment of the library search by an experienced mass sectral interpretation specialist which would by his/her concurrence be a good identification using WA85-J664, J680, Task V on page A-3 and Task III on page 2-3.

PESTICIDE/PCB STANDARDS SUMMARY

Laboratory _____

GC Column _____ GC Instrument ID _____

	DATE OF ANALYSIS _____ TIME OF ANALYSIS _____ LABORATORY ID _____				DATE OF ANALYSIS _____ TIME OF ANALYSIS _____ LABORATORY ID _____			
COMPOUND	RT	RETENTION TIME WINDOW	CALIBRATION FACTOR	CONF. OR QUANT.	RT	CALIBRATION FACTOR	CONF. OR QUANT.	PERCENT DIFF. **
alpha-BHC								
beta-BHC								
delta-BHC								
gamma-BHC								
Heptachlor								
Aldrin								
Heptachlor Epoxide								
Endosulfan I								
Dieldrin								
4,4'-DDE								
Endrin								
Endosulfan II								
4,4'-DDD								
Endrin Aldehyde								
Endosulfan Sulfate								
4,4'-DDT								
Methoxychlor								
Endrin Ketone								
Tech. Chlordane								
alpha-Chlordane*								
gamma-Chlordane*								
Toxaphene								
Aroclor - 1016								
Aroclor - 1221								
Aroclor - 1232								
Aroclor - 1242								
Aroclor - 1248								
Aroclor - 1254								
Aroclor - 1260								

* SEE EXHIBIT B, PART 7

** CONF. = CONFIRMATION (<20% DIFFERENCE)
QUANT. = QUANTITATION (<10% DIFFERENCE)

Form P-1. Pesticide/PCB Standards Summary.

Revised 10/85

Pesticide/PCB Identification

Case No. _____ Laboratory _____

Contract No. _____

SAMPLE ID	PRIMARY COLUMN	PESTICIDE/ PCB	RT OF TENTATIVE ID	RT WINDOW OF APPROPRIATE STANDARD	CONFIRMATION COLUMN	RT ON CONFIRMATORY COLUMN	RT WINDOW OF APPROPRIATE STANDARD	GC/MS CONFIRMED (Y or N)

Form DWM P-2
Revised 10/85

METALS

ANALYTICAL RESULTS & QUALITY ASSURANCE DATA

Parameter	Concentration, Units:	MDL[1]; Units:	QC REPLICATE ANALYSIS			QC MATRIX SPIKE ANALYSIS			METHOD BLANK ANALYSIS	
			Sample ID:	Duplicate	RPD[2]	Unspiked Sample Conc: ID:	Conc Added Units:	% Recovery	1	2
1. Aluminum										
2. Antimony										
3. Arsenic										
4. Barium										
5. Beryllium										
6. Cadmium										
7. Calcium										
8. Chromium										
9. Cobalt										
10. Copper										
11. Iron										
12. Lead										
13. Magnesium										
14. Manganese										
15. Mercury										
16. Nickel										
17. Potassium										
18. Selenium										
19. Silver										
20. Sodium										
21. Thallium										
22. Tin										
23. Vanadium										
24. Zinc										
25. Cyanide										

1. MDL: Minimum Detection Limit
2. RPD: Relative Percent Difference

METALS
INITIAL AND CONTINUING CALIBRATION VERIFICATION

PARAMETER	INITIAL CALIBRATION STANDARD CONCENTRATION UNITS: BLANK	1	2	3	CONTINUOUS CALIBRATION VERIFICATION TRUE VALUE UNITS:	REPORTED VALUE 1	% RECOVERY	REPORTED VALUE 2	% RECOVERY	FINAL REPORTED VALUE	FINAL % RECOVERY	BLANK ANALYSES CONTINUING CALIBRATION 1	2	FINAL
1. Aluminum														
2. Antimony														
3. Arsenic														
4. Barium														
5. Beryllium														
6. Cadmium														
7. Calcium														
8. Chromium														
9. Cobalt														
10. Copper														
11. Iron														
12. Lead														
13. Magnesium														
14. Manganese														
15. Mercury														
16. Nickel														
17. Potassium														
18. Selenium														
19. Silver														
20. Sodium														
21. Thallium														
22. Tin														
23. Vanadium														
24. Zinc														
25. Cyanide														

FORM DVM-M2

Revised 10/85

Form M-3

ICP INTERFERENCE CHECK SAMPLE

LAB NAME _____ CASE NO. _____

DATE _____ Check Sample I.D. _____

Check Sample Source _____

Units _____

Compound	Control Limits[1] Mean	± 20% of Mean	True[2]	Initial Observed	%R	Final Observed	%R
Metals:							
1. Aluminum							
2. Antimony							
3. Arsenic							
4. Barium							
5. Beryllium							
6. Cadmium							
7. Calcium							
8. Chromium							
9. Cobalt							
10. Copper							
11. Iron							
12. Lead							
13. Magnesium							
14. Manganese							
15. Mercury							
16. Nickel							
17. Potassium							
18. Selenium							
19. Silver							
20. Sodium							
21. Thallium							
22. Tin							
23. Vanadium							
24. Zinc							

[1] Mean value based on n = _____.

[2] True value of EPA ICAP Quality Control Sample or contractor standard.

Form IV-4

STANDARD ADDITION RESULTS

LAB NAME _____ CASE NO. _____

DATE _____ UNITS _____

Sample #	Element	0 ADD ABS.	1 ADD CON./ABS.[1]	2 ADD CON./ABS.	3 ADD CON./ABS.	FINAL CON.	r*

[1] - report concentration and absorbance for each addition.

*"r" is the correlation coefficient.

+ - correlation coefficient is outside of control window of 0.990.

TCDD DATA REPORT FORM

Lab: ____________________

Case No: ____________________

Batch/Shipment No. ____________________

Report Date: ____________________

Column: ____________________

Sample Number	Matrix (Class)*	Aliquot Wet Wt.(g)	13C TCDD Recov.	DL	GC/MS Analysis Instr. ID	Date	Time	Rel. Ion Abund 320/322	332/334	37Cl Surrogate Recov.	% Acc	Relative Ion Abundance [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Comments

RB = Reagent Blank
P = Partial Scan/Confirmatory Analysis
S = Native TCDD Spike
D = Duplicate/Fortified Field Blank
FB = Field Blank
ND = Not Detected
DL = Detection Limit

*Corrected for contribution by native TCDD; 0.5% of m/z 322 subtracted.

DWM-01
(x) 10/85

TCDD DATA REPORT - PARTIAL SCAN CONFIRMATION

Sample Number	Response Ratios					% Relative Abundances*						
	320/322	320/324	257/322	257/259	194/196	160	161	194	196	257	259	320

*Relative to m/e 322.

INITIAL CALIBRATION SUMMARY

Date	Instr. ID	Sol. ID	Measured RF	Mean RF Used	TCDD Isomer Resolution
			Native Surrogate	Native Surrogate	Percent Valle (Applies for PC c

Solution ID Codes: WA 84-A002

PC = Performance check solution
CC1 = Concentration calibration solution #1 = 0.2 ug/ml
CC2 = Concentration calibration solution #2 = 1.0 ug/ml
CC3 = Concentration calibration solution #3 = 5.0 ug/ml
CC4 = Concentration calibration solution #4 = 20.0 ug/ml
CC5 = Concentration calibration solution #5 = 40.0 ug/ml

Alternately, 3 - 5 other concentrations may be used to satisfy deliverables.

CONTINUING CALIBRATION SUMMARY

Date	Instr. ID	Sol. ID	Measured RF	Mean RF Used	TCDD Isome. Resolutio: Percent Val. (Applies for PC
			Native Surrogate	Native Surrogate	

Solution ID Codes: WA 84-A002

PC = Performance check solution
CC1 = Concentration calibration solution #1 = 0.2 ug/ml
CC2 = Concentration calibration solution #2 = 1.0 ug/ml
CC3 = Concentration calibration solution #3 = 5.0 ug/ml
CC4 = Concentration calibration solution #4 = 20.0 ug/ml
CC5 = Concentration calibration solution #5 = 40.0 ug/ml

Alternaltey, 3 - 5 other concentrations may be used to satisfy deliverables.

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

TIER II DELIVERABLE REQUIREMTENTS

I. SCOPE & PURPOSE

This Tier II approach to Quality Assurance was developed in order to allow rapid environmental action and data turnaround while maintaining a standard of high data.

II. REPORTING

1. General Requirements

a. Cover Page

b. Sample Request Form - Form G-2

c. Chain-of-Custody Form - Form G-3 or Form G-4

d. Methodology Summary

e. Laboratory Chronicle - Form G-5

f. Document must be bound and paginated and must contain a table of contents; set margins and binding appropriately so the document is legible.

2. Requirements of Organics by GC/MS: Volatiles, Acid and Base/Neutral Extractables

a. Tune Summary with signature certification

b. Quantitative Results (uncorrected by blank) and Quality Assurance Data form (must include minimum detection limits, method blank, and matrix spike in duplicate). The appropriate concentration units must be used, e.g. ug/l for water samples or ug/kg (dry weight basis) for soil/solid waste samples.

c. Surrogate Compound Recovery Summary - as per most recent version of EPA Methods 608, 624/625, SW-846, or EPA IFB Method.

d. Sample total ion chromatogram (TIC).

3. Requirements for Pesticides/PCBs (GC/ECD) - same as "2b", "2c" and "2d" above.

   Note: Dibutylchlorendate must be used as a surrogate. Detection Limits must be below NJ Drinking Water Standards for aqueous pesticide samples. NJDEP considers the recovery of DBC for informational purposes only; sample reanalysis based on poor recovery of DBC is not required. When sufficient data becomes available, performance based contract required windows may be established.

   The retention time shift for DBC must be verified in each standard. The retention time shift must be less than 2% for packed columns and less than 0.3% for capillary columns.

4. Requirements for Metals - at a minimum, analytical results, method detection limits and method blank results are mandatory.

   NOTE: Detection limits must be below the NJ Drinking Water Standards for aqueous samples.

5. Requirements for Inorganics - General Chemistry - same as "2b" above.

   IMPORTANT NOTE: The laboratory shall be responsible for retaining all QA/QC and analytical information acquired via the approved methods for five (5) years for all samples. Although this information is not required to be reported, it must be available to NJDEP for inspection and verification whenever necessary.

(TITLE PAGE)

Analytical Data Report Package

for

New Jersey Department of Environmental Protection

Hazardous Site Mitigation Administration

CN-029

Trenton, N. J. 08625

Case Name	Field Sample #	Laboratory Sample #	Sample Location	Date and Time of Sample Collection

Lab Name _____

Certification # _____

Supervisor/Manager Signature _____

Name _____

Form DWM C-1
Revised 10/85

Form DWQ-0023
Lab

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

SAMPLE ANALYSIS REQUEST FORM

NJDEP File #

SAMPLE LOCATION

NAME OF FACILITY/ COMPANY/PERSON SITE LOCATION	CODE	MAILING ADDRESS

SAMPLE COLLECTOR

SAMPLER(S) Name	Agency	Sampler ID #
Name	Agency	Sampler ID #

SAMPLE IDENTIFICATION

NJDEP SAMPLE NO.	SAMPLING DATE	ABSCISSA (Longitude)
SAMPLE POINT ID	TIME (MIL) SAMPLING BEGAN	ORDINATE (Latitude)
SAMPLE SOURCE CODE	TIME (MIL) SAMPLING FINISHED	ELEVATION
REFERENCE POINT		

SAMPLING PROCESS

COLLECTION METHOD	Code	Other	SAMPLE TYPE	Code	Other
TYPE OF SAMPLER	Code	Other	SAMPLE MATRIX	Code	Other
DESCRIPTION					

FIELD MEASUREMENTS

SAMPLE TEMP. °C	PARAMETER	PARAMETER	PARAMETER
AIR TEMP. °C	VALUE	VALUE	VALUE
WEATHER			

CHAIN-OF-CUSTODY IMPLEMENTED ☐ YES ☐ NO | PRESERVATION CODE(S) ___ ___ ___ ___ ___

REQUESTED ANALYSIS(ES)

PARAMETERS (by Compound or Group of Compounds)	CONTAINER NUMBER	DETECTION LIMIT (ug/l or units)	PRECISION & ACCURACY LIMITS	REQUEST TURNOVER (days)

ANALYSIS(ES) AUTHORIZED BY | TITLE

m DWM C-2 Revised 10/85

ANALYZING LABORATORY

CONTRACT NAME | PERSON ACCEPTING SAMPLE | TITLE

Form DHES-CCR
6/84

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

CHAIN OF CUSTODY RECORD

Use One Form for Each Sample — *Shaded Areas for DEP Field Use Only*

NAME OF UNIT AND ADDRESS

Name of Person(s) Preparing Container(s) for Sample Shuttle

Name | Title | Agency

Name | Title | Agency

Date above-mentioned Person(s) Placed Container(s) in Sample Shuttle | Military Time | Laboratory Affixed Sample Shuttle Seal No.

Name of Person(s) Breaking Laboratory Seal on Sample Shuttle and Taking Field Sample

Name _____ Title _____

Name _____ Title _____

Name Title

Date Laboratory Sample Shuttle Seal No. Broken | Time (Mil) Seal Broken and Sampling Begun

FIELD SAMPLE NUMBER	CONTAINER NUMBER(S)	VOLUME OF CONTAINERS	DESCRIPTION OF SAMPLE

LAB CONTROL NO. _____

Date Sampling Completed & Field Seal Affixed to Sample Shuttle | Military Time | Field Affixed Sample Shuttle Seal No.

Laboratory Person Breaking Field Seal on Sample Shuttle & Accepting Responsibility for Sample — Name — Title

Field Sample Seal No. | Date Broken | Military Time Seal Broken

SAMPLE RELINQUISHED BY	SAMPLE RECEIVED BY	DATE	TIME	REASON FOR CHANGE OF CUSTODY

Form DHES-CCR Revised 10/85

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
TRENTON, NEW JERSEY 08625

CHAIN OF CUSTODY RECORD

NAME OF UNIT AND ADDRESS

SAMPLE NUMBER	Number of Containers	DESCRIPTION OF SAMPLES

SIGNATURE ASSUMING RESPONSIBILITY FOR SAMPLE: | TIME | DATE

SAMPLE NUMBER	RELINQUISHED BY:	RECEIVED BY:	TIME	DATE	REASON FOR CHANGE OF CUSTODY

Form DWM G-4 Revised 10/85

LABORATORY CHRONICLE

DATE

RECEIPT/REFRIGERATION_____

ORGANICS
EXTRACTION

1. Acids_____
2. Base/Neutrals_____
3. Pesticides/PCBs_____
4. Dioxin_____

ANALYSIS

1. Volatiles_____
2. Acids_____
3. Base/Neutrals_____
4. Pesticides/PCBs_____
5. Dioxin_____

Section Supevisor_____
Review & Approval

INORGANICS

1. Metals_____
2. Cyanides_____
3. Phenol_____

OTHER ANALYTES

_____
_____
_____

Section Supervisor_____
Review & Approval

Quality Control Supervisor_____
Review & Approval

If fractions are re-extracted and re-analyzed because initial endeavors did not meet quality control acceptance criteria, include dates for both.

FORM DWM-G5
REVISED 10/85

METHODOLOGY SUMMARY
(Include only fractions actually analysed)

Purgeable Organics

Acid Extractables

Base/Neutral Extractables

Metals

Total Cyanide

Total Phenol

Other

QUANTITATIVE RESULTS

ORGANIC FRACTION:_____
LABORATORY SAMPLE NO:_____
SAMPLE LOCATION/FACILITY:_____

Parameter	Results Sample Concentration Units:	Method Blank Units:

FORM DWM-O-1
REVISED 10/85

WATER MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Case No. _____ Contractor _____ Contract No. _____

FRACTION	COMPOUND	CONC. SPIKE ADDED (ug/L)	SAMPLE RESULT	CONC. MS	% REC	CONC. MSD	% REC	RPD	QC LIMITS* RPD	QC LIMITS* RECOVERY
VOA SMO SAMPLE NO _____	1,1 Dichloroethene								14	61-145
	Trichloroethene								14	71-120
	Chlorobenzene								13	75-130
	Toluene								13	76-125
	Benzene								11	76-127
B/N SMO SAMPLE NO. _____	1,2,4 Trichlorobenzene								28	39-98
	Acenaphthene								31	46-118
	2,4 Dinitrotoluene								38	24-96
	Di-n Butylphthalate								40	11-117
	Pyrene								31	26-127
	N Nitroso Di-n Propylamine								38	41-116
	1,4 Dichlorobenzene								28	36-97
ACID SMO SAMPLE NO _____	Pentachlorophenol								50	9-103
	Phenol								42	12-89
	2 Chlorophenol								40	27-123
	4 Chloro 3 Methylphenol								42	23-97
	4 Nitrophenol								50	10-80
PEST SMO SAMPLE NO. _____	Lindane								15	56-123
	Heptachlor								20	40-131
	Aldrin								22	40-120
	Dieldrin								18	52-126
	Endrin								21	56-121
	4,4'-DDT								27	38-127

*ASTERISKED VALUES ARE OUTSIDE QC LIMITS.

RPD: VOAs ____ out of ____ ; outside QC limits
B/N ____ out of ____ ; outside QC limits
ACID ____ out of ____ ; outside QC limits
PEST ____ out of ____ ; outside QC limits

RECOVERY: VOAs ____ out of ____ ; outside QC limits
B/N ____ out of ____ ; outside QC limits
ACID ____ out of ____ ; outside QC limits
PEST ____ out of ____ ; outside QC limits

Comments: _____

Form DWM O-2
Revised 10/85

SOIL MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Case No. _____ Contractor _____ Contract No. _____

Low Level _____ Medium Level _____

FRACTION	COMPOUND	CONC. SPIKE ADDED (ug/Kg)	SAMPLE RESULT	CONC. MS	% REC	CONC. MSD	% REC	RPD	QC LIMITS * RPD	QC LIMITS * RECOVERY
VOA SMO SAMPLE NO.	1,1 Dichloroethene								22	59-172
	Trichloroethene								24	62-137
	Chlorobenzene								21	60-133
	Toluene								21	59-139
_____	Benzene								21	66-142
B/N SMO SAMPLE NO.	1,2,4 Trichlorobenzene								23	38-107
	Acenaphthene								19	31-137
	2,4 Dinitrotoluene								47	28-89
	Di-n Butylphthalate								47	29-135
	Pyrene								36	35-142
	N Nitroso-di-n Propylamine								38	41-126
_____	1,4 Dichlorobenzene								27	28-104
ACID SMO SAMPLE NO.	Pentachlorophenol								47	17-109
	Phenol								35	26-90
	2 Chlorophenol								50	25-102
	4 Chloro 3 Methylphenol								33	26-103
_____	4 Nitrophenol								50	11-114
PEST SMO SAMPLE NO.	Lindane								50	46-127
	Heptachlor								31	35-130
	Aldrin								43	34-132
	Dieldrin								38	31-134
	Endrin								45	42-139
_____	4,4' DDT								50	23-134

*ASTERISKED VALUES ARE OUTSIDE QC LIMITS.

RPD: VOAs ____ out of ____ ; outside QC limits
B/N ____ out of ____ ; outside QC limits
ACID ____ out of ____ ; outside QC limits
PEST ____ out of ____ ; outside QC limits

RECOVERY: VOAs ____ out of ____ ; outside QC limits
B/N ____ out of ____ ; outside QC limits
ACID ____ out of ____ ; outside QC limits
PEST ____ out of ____ ; outside QC limits

Comments: _____

Form DWM O-3
Revised 10/85

GC/MS STANDARD P-BROMOFLUOROBENZENE (BFB) TUNE
CRITERIA FOR VOLATILES, 20ng LEVEL OR LESS

DATE_____ TIME_____

INSTRUMENT ID_____ ANALYST_____

LAB SAMPLE NO. WHICH WILL BE
AFFECTED BY THIS PERFORMANCE_____

DATA RELEASE AUTHORIZED BY_____

m/e	Ion Abundance Criteria	% Relative Abundance
50	15 - 40% of the base peak	
75	30 - 60% of the base peak	
95	Base peak, 100% relative abundance	
96	5 - 9% of the base peak	
173	Less than 1% of the base peak	
174	Greater than 50% of the base peak	
175	5 - 9% of mass 174	( )[1]
176	Greater than 95%, but less than 101% of 174	( )[1]
177	5 - 9% of mass 176	( )[2]

[1]Value in parenthesis is % of mass 174.
[2]Value in parenthesis is % of mass 176.

GC/MS STANDARD DECAFLUOROTRIPHENYLPHOSPHINE(DFTPP) TUNE CRITERIA FOR SEMIVOLATILES, 20ng LEVEL OR LESS

DATE_____ TIME_____

INSTRUMENT ID_____ ANALYST_____

LAB SAMPLE NO. WHICH WILL BE AFFECTED BY THIS PERFORMANCE_____

DATA RELEASE AUTHORIZED BY_____

m/e	Ion Abundance Criteria	% Relative Abundance
51	30.0 - 60.0% of mass 198	
68	less than 2.0% of mass 69	( )[1]
69	mass 69 relative abundance	
70	less than 2.0% of mass 69	( )[1]
127	40.0 - 60.0% of mass 198	
197	less than 1.0% of mass 198	
198	base peak, 100% relative abundance	
199	5.0 - 9.0% of mass 198	
275	10.0 - 30.0% of mass 198	
365	greater than 1.00% of mass 198	
441	present, but less than mass 443	
442	greater than 40.0% of mass 198	
443	17.0 - 23.0% of mass 442	

[1]Value in parenthesis is % mass 69.
[2]Value in parenthesis is % mass 442.

REVISED FORM O-5
9/85

GC/MS Surrogate Recovery Data

Sample No. _____ Lab Control Number _____ Sample Matrix _____

COMPOUND	CONCENTRATION ADDED TO SAMPLE MATRIX _____ units	% RECOVERY	CONTROL LIMITS (R ± 3s) (Laboratory generated) LOWER	CONTROL LIMITS (R ± 3s) (Laboratory generated) UPPER	QUALIFIED 1
Volatile Fraction (2 required)					
1)					
2)					
Acid Fraction (2 required)					
1)					
2)					
Base/Neutral Fraction (2 required)					
1)					
2)					
Organochlorine Pesticide/PCB Fraction (1 required)					
1)					
2, 3, 7, 8 - TCDD					
1) $^{37}Cl_4$ Isotope 2, 3, 7, 8 - TCDD m.w. 328 (Required)					

Form DWM 0-10

SUMMARY OF NBS (38,700+ analyte version, April '82)

LIBRARY SEARCH RESULTS OF NONTARGETED PEAKS WITH

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ANALYTICAL FRACTION: PURGEABLE ORGANICS

DATA FILE NAME: SAMPLE #

EM	SCAN NUMBER	CAS #	RRT[3]	COMPOUND NAME/m.w.	MATCH FACTOR (PURITY)	ASSESSMENT[1] RS	ISO	UK	ESTIMATED CONC. (ug
1									
2									
3									
4									
5									
6									

SPECTROSCOPIST _____

DATE _____

RS - Reasonable Identification*

ISO - Isomer or Similar Compound

UK - Unknown, not in NBS Library

Calculated versus nearest eluting internal standard as a simple ratio/proportion

RRT vs 2,2'- difluorobiphenyl or d_{10}- phenanthrene, only, for semivolatiles

vs. 1,4- dichlorobutane, only for volatiles.

This shall mean the assessment of the library search by an experienced mass spectral interpretation specialist which would by his/her concurrence be a good identification using WA85-J664, J680, Task V on page A-3 and Task III on page 2-3.

SUMMARY OF NBS (38,700+ analyte version, April '82)

LIBRARY SEARCH RESULTS OF NONTARGETED PEAKS WITH

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ANALYTICAL FRACTION: ACID EXTRACTABLES

DATA FILE NAME: SAMPLE #

ITEM	SCAN NUMBER	CAS #	RRT[3]	COMPOUND NAME/m.w.	MATCH FACTOR (PURITY)	ASSESSMENT[1]			ESTIMATE CONC. (u
						RS	ISO	UK	
1									
2									
3									
4									
5									
6									
7									
8									
9									
0									

SPECTROSCOPIST _____

DATE _____

) RS - Reasonable Identification*
ISO - Isomer or Similar Compound
UK - Unknown, not in NBS Library

) Calculated versus nearest eluting internal standard as a simple ratio/proportion

) RRT vs 2,2'- difluorobiphenyl or d^{10}- phenanthrene, only, for semivolatiles
vs. 1,4- dichlorobutane only for volatiles.

* This shall mean the assessment of the library search by an experienced mass spectral interpretation specialist which would by his/her concurrence be a good identification using WA85-J664, J680, Task V on page A-3 and Task III on page 2-3.

SUMMARY OF NBS (38,700+ analyte version, April '82)

LIBRARY SEARCH RESULTS OF NONTARGETED PEAKS WITH

ESTIMATED CONCENTRATION OF TENTATIVELY IDENTIFIED COMPOUNDS

ANALYTICAL FRACTION: BASE/NEUTRAL

DATA FILE NAME: SAMPLE #

ITEM	SCAN NUMBER	CAS #	RRT[3]	COMPOUND NAME/m.w.	MATCH FACTOR (PURITY)	ASSESSMENT[1] RS	ISO	UK	ESTIMATED CONC.
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									

SPECTROSCOPIST _____

DATE _____

(1) RS - Reasonable Identification*
ISO - Isomer or Similar Compound
UK - Unknown, not in NBS Library

(2) Calculated versus nearest eluting internal standard as a simple ratio/proportion

(3) RRT vs 2,2 - difluorobiphenyl or d^{10}- phenanthrene, only, for semivolatiles
vs. 1,4- dichlorobutane, only for volatiles.

* This shall mean the assessment of the library search by an experienced mass spectral interpretation specialist which would by his/her concurrence be a good identification using WA85-J664, J680, Task V on page A-3 and Task III on page 2-3.

Form DLM 0-13 Revised 10/85

METALS
ANALYTICAL RESULTS & QUALITY ASSURANCE DATA

Parameter	Concentration, Units:	MDL[1]: Units:	QC REPLICATE ANALYSIS			QC MATRIX SPIKE ANALYSIS			METHOD BLANK ANALYSIS	
			Sample ID:	Duplicate	RPD[2]	Unspiked Sample Conc: ID:	Conc Added Units:	% Recovery	1	2
1. Aluminum										
2. Antimony										
3. Arsenic										
4. Barium										
5. Beryllium										
6. Cadmium										
7. Calcium										
8. Chromium										
9. Cobalt										
10. Copper										
11. Iron										
12. Lead										
13. Magnesium										
14. Manganese										
15. Mercury										
16. Nickel										
17. Potassium										
18. Selenium										
19. Silver										
20. Sodium										
21. Thallium										
22. Tin										
23. Vanadium										
24. Zinc										
25. Cyanide										

1. MDL: Minimum Detection Limit
2. RPD: Relative Percent Difference

APPENDIX D

Feasibility Study

Scope of Work

FEASIBILITY STUDY SCOPE OF WORK

I. REQUIREMENTS OF FEASIBILITY STUDY

A. Identify and list all potentially viable remedial action alternatives for the pollution at and/or emanating from the site.

B. Develop alternatives to incorporate remedial technologies into a comprehensive, site-specific approach.

C. Evaluate and compare remedial action alternatives.

D. Recommend the most environmentally sound remedial action alternative which will, in a timely manner:

1. Cleanup pollution at and/or emanating from the site;

2. Achieve and maintain applicable surface-water and ground-water quality standards and cleanup guidelines established by NJDEP;

3. Effectively remediate damage to and provide adequate protection of human health and the environment;

4. Prevent any further off site movement of pollutants in the ground water which have originated at the site; and

5. Remove from the ground water all free floating immiscible organic compounds at the site or emanating from the site.

II. CONTENTS OF FEASIBILITY STUDY WORK PLAN

A. A statement of the requirements for the feasibility study pursuant to Section I. above.

B. A detailed schedule for all feasibility study activities.

1. Schedule of key interim dates in feasibility study;

2. Dates for submission of all required permit applications; and

3. Date for submitting feasibility study report to NJDEP.

C. A list of all potentially viable remedial action alternatives to be considered.

D. A presentation of initial screening procedures in accordance with the following:

1. Screen all potentially viable remedial action alternatives to narrow the list of potential alternatives for further detailed analysis.

2. Initial screening criteria.

   a. Environmental and human health impacts; and

   b. Engineering feasibility and reliability.

3. All alternatives capable of remediating the environmental and human health concerns at and/or emanating from the site shall be retained.

E. A presentation of characteristics to be used to describe remedial action alternatives remaining after initial screening in accordance with the following:

1. Describe appropriate treatment and disposal technologies, as well as any permanent facilities required;

2. Specify engineering considerations required to implement the alternative (e.g., treatability study, pilot treatment facility, additional studies needed to proceed with final remedial design);

3. Describe environmental and human health impacts and propose methods for mitigating or eliminating any adverse impacts;

4. Describe operation and maintenance/ monitoring requirements of the completed remedy;

5. Describe off site disposal needs and transportation plans;

6. Describe temporary storage requirements;

7. Describe requirements for health and safety plans during remedial implementation (including both on site and off site health and safety considerations);

8. Describe how the alternative could be phased into individual operable units, including how various components of the remedy could be implemented individually or in groups resulting in a functional phase of the overall remedy;

9. Describe how the alternative could be segmented into areas to allow implementation of differing phases of the alternative;

10. Describe how alternatives could be combined to create more effective alternatives;

11. Describe which Federal, State and local permits would be necessary for each alternative identified and outline the information necessary for the development of each of the permit applications; and

12. Describe the time required for implementation, including significant interim dates.

F. A detailed discussion of procedure to evaluate and compare the remedial action alternatives that remain after the initial screening in accordance with the following:

1. Evaluate each alternative in accordance with the requirements referenced in I.D. above and the following characteristics:

a. Level of cleanup achievable

b. Time to achieve cleanup

c. Feasibility

d. Implementability

e. Reliability

f. Ability to minimize adverse impacts during action

g. Ability to minimize off site impacts caused by action

h. Useability of ground water

i. Useability of surface water

j. Useability of site

k. Legal constraints

2. Compare each alternatives in accordance with the requirements and characteristics identified in II.F.1. above.

G. Presentation of procedure concerning recommendation of remedial action alternative in accordance with the following:

1. Based on the detailed evaluation process, recommend the most environmentally sound remedial action alternative which will, in the most timely manner, meet the requirements in I.D. above, resulting from the detailed process evaluation.

2. Prepare a detailed rational for recommending the remedial action alternative, stating the advantages over other alternatives considered.

3. Prepare a conceptual design of the recommended alternative including:

   a. Engineering and hydrogeologic approaches;

   b. Implementation schedules;

   c. Any special implementation requirements;

   d. Applicable design criteria;

   e. Preliminary site layout(s);

   f. Operation and maintenance requirements; and

   g. Safety plan(s)

III. CONTENT OF FEASIBILITY STUDY REPORT

A. Detailed discussion of the initial screening of remedial action alternatives according to the approved FS Work Plan

B. Detailed description of remedial action alternatives that remain after initial screening according to the approved FS Work Plan.

C. Detailed evaluation and comparison of remedial action alternatives based on the description presented pursuant to the approved FS Work Plan.

D. Recommendation of, rational for, and conceptual design of most environmentally sound remedial alternatives which meets the requirements in Section I.D. above in the most timely manned according to the approved FS Work Plan.

E. Conceptual design of recommended remedial alternative.

F. List all references used in feasibility study.

APPENDIX E

Remedial Action Scope of Work

REMEDIAL ACTION SCOPE OF WORK

I. DETAILED ENGINEERING DESIGN

II. SCHEDULE FOR CONSTRUCTION, OPERATION AND MAINTENANCE

III. OPERATION, MAINTENANCE, MONITORING AND REPORTING REQUIREMENTS

IV. PERFORMANCE EVALUATION

A. Requirements for the selected remedial action alternative pursuant to I.D. above shall meet or exceed the requirements listed in Appendix D, Item 1.D above.

B. Procedure

1. During implementation of ground-water aspect of the alternative, the recovery wells' radius of influence shall adequately be recovering all polluted ground water.

   a. Adequate performance evaluation monitoring.

   b. Submission of monitoring data, including, but limited to, the following:

      i. Contour map(s) showing the actual thickness of the floating immiscible chemical compounds at and/or emanating from the site;

      ii. Ground-water quality contour map(s);

      iii. Ground-water elevation contour map(s);

      iv. Gallons of immiscible chemical compounds removed from recovery well(s) each month;

      v. Time/volume graph(s) of immiscible chemical compounds removed from recovery well(s);

      vi. Concentrations of dissolved pollutants at all monitor wells and discharged from recovery well(s);

      vii. Time/concentration graph(s) of dissolved pollutants at all monitor wells and discharged from recovery well(s); and

      viii. A histogram showing the volume of water pumped each month from each recovery well.

2. Post cleanup sampling

   a. Soil

   b. Ground water

   c. Surface water and sediment

V. COMPLETE AND DETAILED COST ESTIMATE

APPENDIX F

Letter of Credit Wording

_____, 1986

Commissioner
NEW JERSEY DEPARTMENT OF
ENVIRONMENTAL PROTECTION
CN-402
Trenton, New Jersey 08625

Dear Sir:

We hereby establish our Irrevocable Standby Letter of Credit No. _____ in your favor, at the request and for the account of company name and address, up to the aggregate amount of amount written out U.S. Dollars ($amount) available upon presentation by you of:

1. Your sight draft, bearing reference to this letter of credit No. _____, and

2. Your signed statement reading as follows: "I certify that the amount of the draft is payable to the terms and provisions of the _____, 19__ Administrative Consent Order between the New Jersey Department of Environmental Protection (NJDEP) and company".

3. Proof of receipt by company, at least fifteen (15) calendar days prior to presentation of said letter of certification to the bank of a registered letter notifying company of NJDEP's intent to draw on funds pursuant to this Irrevocable Letter of Credit.

This letter of credit is effective as of _____, 19__ and shall expire on _____, 19__, and shall not be automatically renewable, but shall be renewable upon reapplication and review only.

Whenever this letter of credit is drawn under and in compliance with the terms of this credit, we shall duly honor such draft upon presentation to us, and we shall deposit the amount of the draft directly into the standby trust fund of company in accordance with your instructions.

This credit is subject to the most recent edition of the Uniform Customs and Practice for Documentary Credits published by the International Chamber of Commerce and the laws of the State of New Jersey.

As a condition of this credit, company is hereby required to renew this letter of credit by _____, 19__ (date to be inserted is sixty (60) calendar days from expiration date of this letter of credit).

If company does not renew the letter of credit by _____, 19__ (same date as preceding paragraph), we shall advise you in writing no later than _____, 19__ (date to be inserted is forty-five (45) calendar days prior to expiration date of letter of credit) that company has not reviewed the letter of credit.

If company does not renew this letter of credit by ____, 19__ (sixty (60) calendar days prior to expiration), we will deposit the full amount of the letter of credit into the standby trust fund of company no later than _____, 19__ (fourteen (14) calendar days prior to expiration), and we will notify you in writing by _____, 19__ (seven (7) calendar days prior to expiration) that we did in fact deposit the full amount of the letter of credit.

APPENDIX G

Standby Trust Agreement Wording

TRUST AGREEMENT

Trust Agreement "Agreement," entered into as of ___date___ by and between company known as "Grantor" and issuing institution the "Trustee."

Whereas, the New Jersey Department of Environmental Protection, "NJDEP," an agency of the State of New Jersey, has entered into an Administrative Consent Order with Grantor dated _____, 19__, a copy of which is annexed hereto as Schedule "A," pursuant to which Grantor is obligated to establish a trust fund to assure the availability of funds to secure the performance of Grantor's obligations under that Administrative Consent Order.

Whereas, the Grantor, acting through its duly authorized officers, has selected the Trustee to be the trustee under this agreement, and the Trustee is willing to act as trustee.

NOW, THEREFORE, THE GRANTOR AND THE TRUSTEE AGREE AS FOLLOWS:

Section 1. Definitions.

As used in this Agreement:

a. The term "Grantor" means company who enters into this agreement and any successors or assigns of the Grantor.

b. The term "Trustee" means the Trustee who enters into the Agreement and any successor Trustee, who has the authority to act as a trustee and whose trust operations are regulated and examined by a Federal or New Jersey agency. The name, address and the title of the trustee are _____.

c. The Term "Commissioner" means the Commissioner of the NJDEP.

d. The term "Beneficiary" means the NJDEP.

e. The term "NJDEP" means the New Jersey Department of Environmental Protection

Section 2. Identification of Facilities and Cost Estimates.

This Agreement pertains to the facilities and cost estimates identified on attached Schedule "A."

Section 3. Establishment of Fund.

The Grantor and the Trustee hereby establish a trust fund, the "Fund," for the benefit of NJDEP. The Grantor and the Trustee intend that no third party have access to the Fund except as herein provided. The

Fund is established initially as consisting of the property, which is acceptable to the Trustee, described in Schedule "B," attached hereto. Such property and any other property subsequently transferred to the Trustee is referred to as the Fund, together with all earnings and profits thereon, less any payments or distributions made by the Trustee pursuant to this Agreement. The Fund shall be held by the Trustee, IN TRUST, as herein provided. The Trustee shall not be responsible nor shall it undertake any responsibility for the amount or adequacy of, nor any duty to collect from the Grantor, and payments necessary to discharge any liabilities of the Grantor established by NJDEP.

Section 4. Payment of Administrative Consent Order.

The Trustee shall make payment from the Fund as the NJDEP Commissioner shall direct, in writing, to provide for the payment of the costs of performing Grantor's obligations under the ____, 19__ Administrative Consent Order (annexed hereto as Schedule A) covered by this Agreement. The Trustee shall reimburse the Grantor or other persons, as specified by NJDEP, in such amounts as NJDEP shall direct in writing. In addition, the Trustee shall refund to the Grantor such amounts, as NJDEP specifies in writing. Upon refund, such funds shall no longer constitute part of the Fund, as defined herein.

Section 5. Payments Comprising the Fund.

Payments made to the Trustee for the Fund shall consist of cash or securities acceptable to the Trustee.

Section 6. Trustee Management.

The Trustee shall invest and reinvest the principal and income of the Fund and keep the Fund invested as a single fund, without distinction between principal and income, in accordance with general investment policies and guidelines which the Grantor may communicate in writing to the Trustee from time to time, subject, however, to the provisions of this Section. In investing, reinvesting, exchanging, selling and managing the Fund, the Trustee shall discharge his/her duties with respect to the Trust fund solely in the interest of the beneficiary and with the care, skill, prudence and diligence under the circumstances then prevailing which persons of prudence, acting in a like capacity and familiar with such matters, would use in the conduct of an enterprise of a like character and with like aims; except that:

a. Securities or other obligations of the Grantor, or any other owner or operator of the facilities or any of their affiliates, as defined in the Investment Company Act of 1940, as amended, 15 U.S.C. 80a-2(a), shall be acquired or held, unless they are securities or other obligations of the Federal or a State government;

b. The Trustee is authorized to invest the Fund in time or demand deposits of the Trustee, to the extent insured by an agency of the Federal or State government; and

c. The trustee is authorized to hold cash awaiting investment or distribution uninvested for a reasonable time and without liability for the payment of interest thereon.

Section 7. Commingling and Investment.

The Trustee is expressly authorized in its discretion:

a. To transfer from time to time any or all of the assets of the Fund to any common, commingled or collective trust fund created by the Trustee in which the Fund is eligible to participate, subject to all of the provisions thereof, to be commingled with the assets of other trusts participating therein; and

b. To purchase shares in any investment company registered under the Investment Company Act of 1940, 15 U.S.C. 80a-1 et seq., including one which may be created, managed, underwritten, or to which investment advice is rendered or the shares of which are sold by the Trustee. The Trustee may vote such shares in its discretion.

Section 8. Express Powers of Trustee.

Without in any way limiting the powers and discretions conferred upon the Trustee by the other provisions of this Agreement or by law, the Trustee is expressly authorized and empowered:

a. To sell, exchange, convey, transfer or otherwise dispose of any property held by it, by public or private sale. No person dealing with the Trustee shall be bound to see to the application of the purchase money or to inquire into the validity or expedience of any such sale or other disposition;

b. To make, execute, acknowledge and deliver any and all documents of transfer and conveyance and any and all other instruments that may be necessary or appropriate to carry out the powers herein granted;

c. To register any securities held in the Fund in its own name or in the name of a nominee and to hold any security in bearer form or in book entry, or to combine certificates representing such securities with certificates of the same issue held by the Trustee in other fiduciary capacities, or to deposit or arrange for the deposit of such securities in a qualified central depository even though, when so deposited, such securities may be merged and held in bulk in the

name of the nominee of such depository with other securities deposited therein by another person or to deposit or arrange for the deposit of any securities issued by the United States Government or any agency or instrumentality thereof, with a Federal Reserve bank, but the books and records of the Trustee shall at all time show that all securities are part of the Fund;

d. To deposit any cash in the Fund in interest-bearing accounts maintained or savings certificates issued by the Trustee, in its separate corporate capacity, or in any other banking institution affiliated with the Trustee, to the extent insured by an agency of the Federal or State Government; and

e. To compromise or otherwise adjust all claims in favor of or against the Fund.

Section 9. Taxes and Expenses.

All taxes of any kind that may be assessed or levied against or in respect of the Fund and all brokerage commissions incurred by the Fund shall be paid from the Fund. All other expenses incurred by the Trustee in connection with the administration of this Trust, including fees for legal services rendered to the Trustee, the compensation of the Trustee to the extent not paid directly by the Grantor, and all other proper charges and disbursements of the Trustee shall be paid from the Fund.

Section 10. Annual Valuation.

The Trustee shall annually, at least thirty (30) calendar days prior to the anniversary date of establishment of the Fund, furnish to the Grantor and to NJDEP a statement confirming the value of the Trust. Any securities in the Fund shall be valued at market value as of no more than sixty (60) calendar days prior to the anniversary date of establishment of the Fund. The failure of the Grantor to object in writing to the Trustee within ninety (90) calendar days after the statement has been furnished to the Grantor and NJDEP shall constitute a conclusively binding assent by the Grantor, barring the Grantor from asserting any claim or liability against the Trustee with respect to matters disclosed in the statement.

Section 11. Advice of Counsel.

The Trustee may from time to time consult with counsel, who may be counsel to the Grantor, with respect to any questions arising as to the construction of this Agreement of any action to be taken hereunder. The Trustee shall be fully protected, to the extent permitted by law, in acting upon the advice of counsel.

Section 12. Trustee Compensation.

The Trustee shall be entitled to reasonable compensation for its services, as agreed upon in writing from time to time with the Grantor.

Section 13. Successor Trustee.

The Trustee may resign or the Grantor may replace the Trustee, but such resignation or replacement shall not be effective until the Grantor has appointed a successor trustee and this successor accepts the appointment. The successor trustee shall have the same powers and duties as those conferred upon the Trustee hereunder. Upon the successor trustee's acceptance of the appointment, the Trustee shall assign, transfer and pay over to the successor trustee the funds and properties then constituting the Fund. If for any reason, the Grantor cannot or does not act in the event of the resignation of the Trustee, the Trustee may apply to a court of competent jurisdiction for the appointment of a successor trustee or for instructions. The successor trustee shall specify the date on which it assumes administration of the trust in a writing sent to the Grantor, NJDEP and the present Trustee by certified mail ten (10) calendar days before such change becomes effective. Any expenses incurred by the Trustee as a result of any of the acts contemplated by this Section shall be paid as provided in Section 9.

Section 14. Instructions to the Trustee.

All orders, requests and instructions by the Grantor to the Trustee shall be in writing, signed by such persons as are designated in the attached Schedule "C." The Trustee shall be fully protected in acting without inquiry in accordance with the Grantor's orders, requests and instructions. All orders, requests, and instructions by NJDEP to the Trustee shall be in writing, signed by the NJDEP Commissioner or his/her designee and the Trustee shall act and shall be fully protected in acting in accordance with such orders, requests and instructions. The Trustee shall have the right to assume, in the absence of written notice to the contrary, that no event constituting a change or a termination of the authority of any person to act on behalf of the Grantor or NJDEP hereunder has occurred. The Trustee shall have no duty to act in the absence of such orders, requests and instructions from the Grantor and/or NJDEP, except as provided for herein.

Section 15. Amendment of Agreement.

This Agreement may be amended by an instrument in writing executed by the Grantor, the Trustee and NJDEP or by the Trustee and NJDEP if the Grantor ceases to exist.

Section 16. Irrevocability and Termination.

Subject to the right of the parties to amend this Agreement, as provided in Section 15, this Trust shall be irrevocable and shall continue until terminated at the written agreement of the Grantor, the Trustee and NJDEP or of the Trustee and NJDEP, if the Grantor ceases to exist. Upon termination of the Trust, all remaining trust property, less final trust administration expenses, shall be delivered to the Grantor.

Section 17. Immunity and Indemnification.

The Trustee shall not incur personal liability of any nature in connection with any act or omission, made in good faith, in the administration of this Trust or in carrying out any directions by the Grantor of NJDEP issued in accordance with this Agreement. The Trust shall be indemnified and saved harmless by the Grantor or from the Trustee Fund, or both, from and against any personal liability to which the Trustee may be subjected by reason of any act or conduct in its official capacity, including all expenses reasonably incurred in its defense in the event the Grantor fails to provide such defense.

Section 18. Choice of Law.

This Agreement shall be administered, construed and enforced according to the laws of the State of New Jersey.

Section 19. Interpretation.

As used in this Agreement, words in the singular include the plural and words in the plural include the singular. The descriptive headings for each Section of this Agreement shall not affect the interpretation or the legal efficacy of this Agreement.

In Witness Whereof the parties have caused this Agreement to be executed by their respective officers, duly authorized, and their corporate seals to be hereunto affixed and attested, as of the date first above written:

_____
(Signature of Grantor/Title)

ATTEST:

_____
[Title/Seal]

_____
(Signature of Trustee)

ATTEST:

_____
[Title/Seal]

SCHEDULE A

Instructions to Grantor:

Include a copy of Administrative Consent Order here.

SCHEDULE B

Instructions to Grantor:

Include here the initial amount of money the Administrative Consent Order requires you to deposit in the irrevocable standby trust fund.

SCHEDULE C

Instructions to Grantor:

Include here the required information of your designee for communications with trustee.

_____individual's name_____, ___title_____

____company_____